

Chapter : 17. PERIMETER AND AREA OF PLANE FIGURES

Exercise : 17A

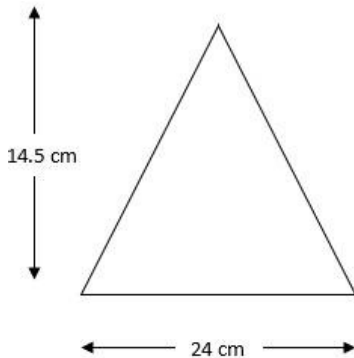
Question: 1

Find the area of

Solution:

Given: Base = 24 cm

Height = 14.5 cm



We know that,

Area of a triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= \frac{1}{2} \times 24 \text{ cm} \times 14.5 \text{ cm}$$

$$= 174 \text{ cm}^2$$

Question: 2

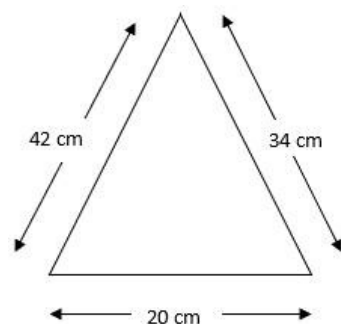
Find the area of

Solution:

Given: Side 1 = a (let) = 42 cm

Side 2 = b (let) = 34 cm

Side 3 = c (let) = 20 cm



We know that,

Area of a scalene triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

$$\text{Where, } s = \frac{a+b+c}{2}$$

$$s = \frac{42 + 34 + 20}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$= s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48\text{cm} \times (48-42)\text{cm} \times (48-34)\text{cm} \times (48-20)\text{cm})}$$

$$= \sqrt{(48\text{cm} \times 6\text{cm} \times 14\text{cm} \times 28\text{cm})}$$

$$= \sqrt{112896 \text{ cm}^2}$$

$$= 336 \text{ cm}^2$$

Clearly,

$$\text{Length of longest side} = 42 \text{ cm}$$

Now,

We know that,

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= 336 \text{ cm}^2 = \frac{1}{2} \times 42 \text{ cm} \times \text{Height}$$

$$= 336 \text{ cm}^2 = 21 \text{ cm} \times \text{Height}$$

$$\Rightarrow \text{Height} = \frac{336 \text{ cm}^2}{21 \text{ cm}}$$

$$= \text{Height} = 16 \text{ cm}$$

Question: 3

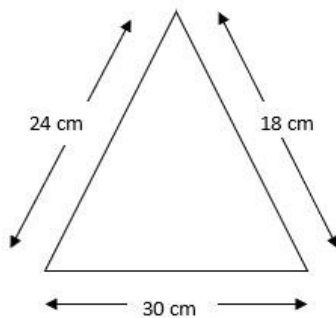
Find the area of

Solution:

$$\text{Given: Side 1} = a \text{ (let)} = 18 \text{ cm}$$

$$\text{Side 2} = b \text{ (let)} = 24 \text{ cm}$$

$$\text{Side 3} = c \text{ (let)} = 30 \text{ cm}$$



We know that,

$$\text{Area of a scalene triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{Where, } s = \frac{a+b+c}{2}$$

$$s = \frac{18 + 24 + 30}{2} \text{ cm}$$

$$\Rightarrow s = \frac{72}{2} \text{ cm}$$

$$= s = 36 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(36\text{cm} \times (36-18)\text{cm} \times (36-24)\text{cm} \times (36-30)\text{cm})}$$

$$= \sqrt{(36\text{cm} \times 18\text{cm} \times 12\text{cm} \times 6\text{cm})}$$

$$= \sqrt{46656} \text{ cm}^2$$

$$= 216 \text{ cm}^2$$

Clearly,

Length of smallest side = 18 cm

Now,

We know that,

Area of a triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

$$= 216 \text{ cm}^2 = \frac{1}{2} \times 18 \text{ cm} \times \text{Height}$$

$$= 216 \text{ cm}^2 = 9 \text{ cm} \times \text{Height}$$

$$\Rightarrow \text{Height} = \frac{216 \text{ cm}^2}{9 \text{ cm}}$$

$$= \text{Height} = 24 \text{ cm}$$

Question: 4

The sides of a tr

Solution:

Given: Ratio of Sides = 5 : 12 : 13

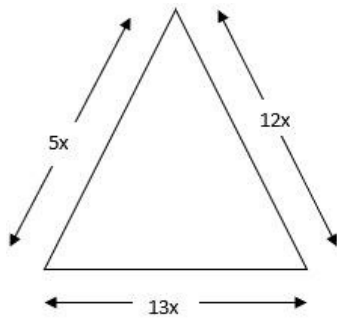
Perimeter = 150 cm

Let the sides be,

$$a = 5x \text{ cm}$$

$$b = 12x \text{ cm}$$

$$c = 13x \text{ cm}$$



We know that,

Perimeter of a triangle = $a + b + c$

$$= 150 \text{ cm} = 5x \text{ cm} + 12x \text{ cm} + 13x \text{ cm}$$

$$= 150 \text{ cm} = 30x \text{ cm}$$

$$\Rightarrow x = \frac{150 \text{ cm}}{30 \text{ cm}}$$

$$= x = 5$$

Therefore,

$$a = 5x \text{ cm} = 5 \times 5 \text{ cm} = 25 \text{ cm}$$

$$b = 12x \text{ cm} = 12 \times 5 \text{ cm} = 60 \text{ cm}$$

$$c = 13x \text{ cm} = 13 \times 5 \text{ cm} = 65 \text{ cm}$$

Now,

We know that,

$$\text{Area of a scalene triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{Where, } s = \frac{a+b+c}{2}$$

$$s = \frac{25 + 60 + 65}{2} \text{ cm}$$

$$\Rightarrow s = \frac{150}{2} \text{ cm}$$

$$\Rightarrow s = 75 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(75 \text{ cm} \times (75-25) \text{ cm} \times (75-60) \text{ cm} \times (75-65) \text{ cm})}$$

$$= \sqrt{(75 \text{ cm} \times 50 \text{ cm} \times 15 \text{ cm} \times 10 \text{ cm})}$$

$$= \sqrt{562500 \text{ cm}^2}$$

$$= 750 \text{ cm}^2$$

Question: 5

The perimeter of

Solution:

Given: Ratio of Sides = 25 : 17 : 12

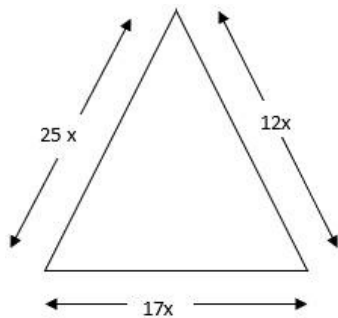
Perimeter = 540 m

Let the sides be,

$$a = 25x \text{ m}$$

$$b = 17x \text{ m}$$

$$c = 12x \text{ m}$$



We know that,

$$\text{Perimeter of a triangle} = a + b + c$$

$$\Rightarrow 540 \text{ m} = 25x \text{ m} + 17x \text{ m} + 12x \text{ m}$$

$$\Rightarrow 540 \text{ m} = 54x \text{ m}$$

$$\Rightarrow x = \frac{540 \text{ m}}{54 \text{ m}}$$

$$\Rightarrow x = 10$$

Therefore,

$$a = 25x \text{ m} = 25 \times 10 \text{ m} = 250 \text{ m}$$

$$b = 17x \text{ m} = 17 \times 10 \text{ m} = 170 \text{ m}$$

$$c = 12x \text{ m} = 12 \times 10 \text{ m} = 120 \text{ m}$$

Now,

We know that,

Area of a scalene triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

Where, $s = \frac{a+b+c}{2}$

$$s = \frac{250 + 170 + 120}{2} \text{ m}$$

$$\Rightarrow s = \frac{540}{2} \text{ m}$$

$$\Rightarrow s = 270 \text{ m}$$

Now,

Area of a scalene triangle =

$$\sqrt{(270\text{m} \times (270-250)\text{m} \times (270-170)\text{m} \times (270-120)\text{m})} = \sqrt{(270\text{m} \times 20\text{m} \times 10\text{m} \times 150\text{cm})}$$

$$= \sqrt{81000000} \text{ m}^2$$

$$= 9000 \text{ m}^2$$

Now,

The cost of ploughing $100 \text{ m}^2 = \text{Rs } 40$

Therefore, The cost of ploughing $1 \text{ m}^2 = \text{Rs } \frac{40}{100}$

Therefore, The cost of ploughing $9000 \text{ m}^2 = \text{Rs } \frac{40}{100} \times 9000$

$$= \text{Rs } 3600$$

Question: 6

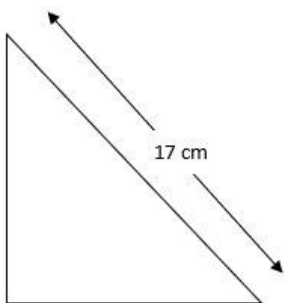
The perimeter of

Solution:

Given: Perimeter = 40 cm

Hypotenuse = 17 cm

The diagram is given as:



Let the sides be a, b and c(hypotenuse).

Therefore, $a + b + c = 40 \text{ cm}$

$$= a + b + 17 = 40 \text{ cm}$$

$$= a + b = 40 - 17 \text{ cm}$$

$$= a + b = 23 \text{ cm}$$

$$= a = (23-b) \text{ cm}$$

Now we know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= a^2 + b^2 = c^2$$

$$= (23-b)^2 + b^2 = 17^2$$

$$= 23^2 + b^2 - 46b + b^2 = 289$$

$$= 529 + b^2 - 46b + b^2 = 289$$

$$= 2b^2 - 46b + 240 = 0$$

$$= b^2 - 23b + 120 = 0$$

$$= b^2 - 8b - 15b + 120 = 0$$

$$= b(b-8) - 15(b-8) = 0$$

$$= (b-8)(b-15) = 0$$

This gives us two equations,

$$\text{i. } b-8 = 0$$

$$= b = 8$$

$$\text{ii. } b-15 = 0$$

$$= b = 15$$

Let $b = 8$ cm

$$= a = (23-b) \text{ cm}$$

$$= a = (23-8) \text{ cm}$$

$$= a = 15 \text{ cm}$$

Now,

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times 8 \times 15$$

$$= 60 \text{ cm}^2$$

Question: 7

The difference be

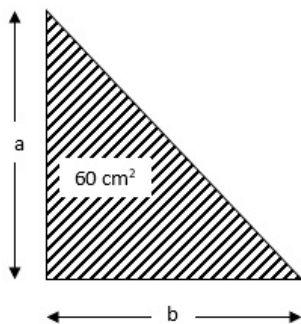
Solution:

Let the sides at right angles be a and b

And, the third side be c .

Given: $a-b = 7$ cm

$$\text{Area of triangle} = 60 \text{ cm}^2$$



Now, since $a-b = 7$

$$= a = b + 7$$

Now we know that,

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= 60 = \frac{1}{2} \times b \times (b + 7)$$

$$= 60 \times 2 = b^2 + 7b$$

$$= b^2 + 7b = 120$$

$$= b^2 + 7b - 120 = 0$$

$$= b^2 + 15b - 8b - 120 = 0$$

$$= b(b + 15) - 8(b + 15) = 0$$

$$= (b + 15)(b - 8) = 0$$

This gives us two equations,

$$\text{i. } b - 8 = 0$$

$$= b = 8$$

$$\text{ii. } b + 15 = 0$$

$$= b = -15$$

Since, the side of the triangle cannot be negative

Therefore, $b = 8$ cm

$$= a = (b + 7) \text{ cm}$$

$$= a = (8 + 7) \text{ cm}$$

$$= a = 15 \text{ cm}$$

Now we know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= a^2 + b^2 = c^2$$

$$= 15^2 + 8^2 = c^2$$

$$= c^2 = 225 + 64$$

$$= c^2 = 289$$

$$= c = 17$$

Now,

$$\text{Perimeter of triangle} = a + b + c$$

$$= \text{Perimeter of triangle} = 15 + 8 + 17$$

$$= \text{Perimeter of triangle} = 40 \text{ cm}$$

Question: 8

The lengths of th

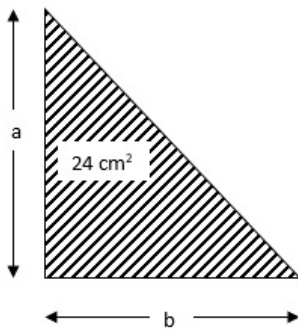
Solution:

Let the sides at right angles be a and b

And, the third side be c .

$$\text{Given: } a - b = 2 \text{ cm}$$

$$\text{Area of triangle} = 24 \text{ cm}^2$$



Now, since $a - b = 2$

$$\Rightarrow a = b + 2$$

Now we know that,

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$\Rightarrow 24 = \frac{1}{2} \times b \times (b + 2)$$

$$\Rightarrow 24 \times 2 = b^2 + 2b$$

$$\Rightarrow b^2 + 2b = 48$$

$$\Rightarrow b^2 + 2b - 48 = 0$$

$$\Rightarrow b^2 + 8b - 6b - 48 = 0$$

$$\Rightarrow b(b + 8) - 6(b + 8) = 0$$

$$\Rightarrow (b + 8)(b - 6) = 0$$

This gives us two equations,

$$\text{i. } b + 8 = 0$$

$$\Rightarrow b = -8$$

$$\text{ii. } b - 6 = 0$$

$$\Rightarrow b = 6$$

Since, the side of the triangle cannot be negative

Therefore, $b = 6 \text{ cm}$

$$\Rightarrow a = (b + 2) \text{ cm}$$

$$\Rightarrow a = (6 + 2) \text{ cm}$$

$$\Rightarrow a = 8 \text{ cm}$$

Now we know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$\Rightarrow a^2 + b^2 = c^2$$

$$\Rightarrow 8^2 + 6^2 = c^2$$

$$\Rightarrow c^2 = 64 + 36$$

$$\Rightarrow c^2 = 100$$

$$\Rightarrow c = 10$$

Now,

$$\text{Perimeter of triangle} = a + b + c$$

$$\Rightarrow \text{Perimeter of triangle} = 8 + 6 + 10$$

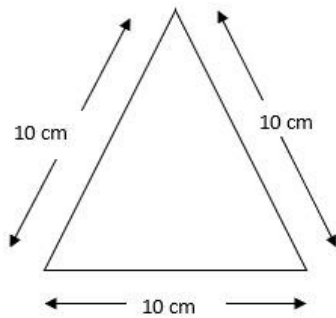
= Perimeter of triangle = 24 cm

Question: 9

Each side of an e

Solution:

Given: Side of an equilateral triangle = 10 cm



(i) Area of equilateral triangle = $\frac{\sqrt{3}}{4} \times \text{side}^2$

$$= \frac{\sqrt{3}}{4} \times 10^2$$

$$= \frac{\sqrt{3}}{4} \times 100$$

$$= \frac{100\sqrt{3}}{4}$$

$$= 25\sqrt{3}$$

$$= 25 \times 1.732$$

$$= 43.3 \text{ cm}^2$$

(ii) Height of equilateral triangle = $\frac{\sqrt{3}}{2} \times a$

$$= \frac{\sqrt{3}}{2} \times 10$$

$$= \frac{10\sqrt{3}}{2}$$

$$= 5\sqrt{3}$$

$$= 5 \times 1.732$$

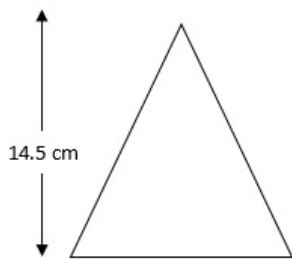
$$= 8.66 \text{ cm}^2$$

Question: 10

The height of an

Solution:

Given: Height of an equilateral triangle = 6 cm



Let sides of equilateral triangle be a cm

We know that,

$$\text{Height of equilateral triangle} = \frac{\sqrt{3}}{2} \times a$$

$$\Rightarrow 6 = \frac{\sqrt{3}}{2} \times a$$

$$= 6 \times 2 = \sqrt{3} \times a$$

$$= 12 = a\sqrt{3}$$

$$\Rightarrow a = \frac{12}{\sqrt{3}}$$

$$\Rightarrow a = \frac{12}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$\Rightarrow a = \frac{12\sqrt{3}}{3}$$

$$= a = 4 \times 1.73$$

$$= 6.92 \text{ cm}^2$$

Now,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 6.92^2$$

$$= \frac{\sqrt{3}}{4} \times 47.88$$

$$= 11.98\sqrt{3} \text{ cm}^2$$

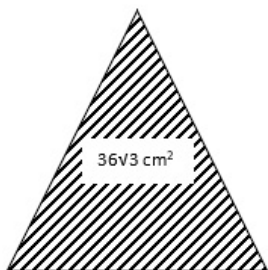
$$= 20.76 \text{ cm}^2$$

Question: 11

If the area of an

Solution:

$$\text{Given: Area of an equilateral triangle} = 36\sqrt{3} \text{ cm}^2$$



We know that,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow 36\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow \text{side}^2 = 36\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$$= \text{side}^2 = 36 \times 4$$

$$= \text{side} = 12 \text{ cm}$$

Now,

$$\text{Perimeter of equilateral triangle} = 3 \times \text{side}$$

$$= 3 \times 12 \text{ cm}$$

$$= 36 \text{ cm}$$

Question: 12

If the area of an

Solution:

$$\text{Given: Area of an equilateral triangle} = 81\sqrt{3} \text{ cm}^2$$



We know that,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow 81\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow \text{side}^2 = 81\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$$= \text{side}^2 = 81 \times 4$$

$$= \text{side} = 18 \text{ cm}$$

Now,

$$\text{Height of equilateral triangle} = \frac{\sqrt{3}}{2} \times \text{side}$$

$$= \frac{\sqrt{3}}{2} \times 18$$

$$= 9\sqrt{3} \text{ cm}$$

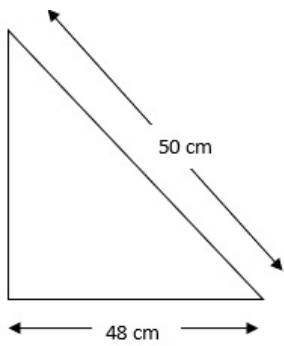
Question: 13

The base of a rig

Solution:

$$\text{Given: Base} = 48 \text{ cm}$$

$$\text{Hypotenuse} = 50 \text{ cm}$$



We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= 48^2 + \text{Perpendicular}^2 = 50^2$$

$$= \text{Perpendicular}^2 = 50^2 - 48^2$$

$$= \text{Perpendicular}^2 = 2500 - 2304$$

$$= \text{Perpendicular}^2 = 196 \text{ cm}^2$$

$$= \text{Perpendicular} = 14 \text{ cm}$$

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 48 \text{ cm} \times 14 \text{ cm}$$

$$= 336 \text{ cm}^2$$

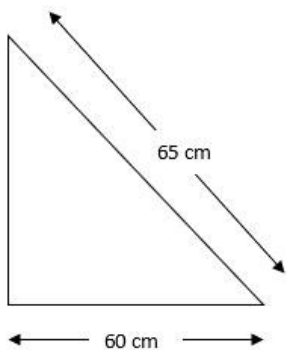
Question: 14

The hypotenuse of

Solution:

Given: Base = 60 cm

Hypotenuse = 65 cm



We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= 60^2 + \text{Perpendicular}^2 = 65^2$$

$$= \text{Perpendicular}^2 = 65^2 - 60^2$$

$$= \text{Perpendicular}^2 = 4225 - 3600$$

$$= \text{Perpendicular}^2 = 625 \text{ cm}^2$$

$$= \text{Perpendicular} = 25 \text{ cm}$$

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 60 \text{ cm} \times 25 \text{ cm}$$

$$= 750 \text{ cm}^2$$

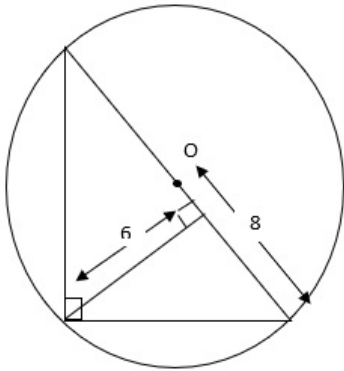
Question: 15

Find the area of

Solution:

Given: Radius of circle = 8 cm

Altitude = 6 cm



Since, in a right-angled triangle the hypotenuse is the diameter of circumcircle.

Therefore,

$$\text{Hypotenuse} = 2 \times \text{Radius}$$

$$= 2 \times 8 \text{ cm}$$

$$= 16 \text{ cm}$$

Now, we consider the hypotenuse as base and the altitude to the hypotenuse as height

So,

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 16 \text{ cm} \times 6 \text{ cm}$$

$$= \frac{1}{2} \times 96 \text{ cm}^2$$

$$= 48 \text{ cm}^2$$

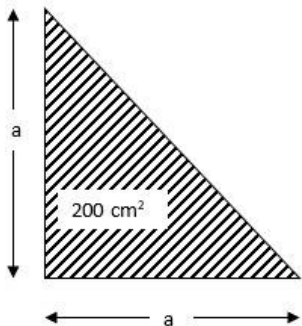
Question: 16

Find the length o

Solution:

Given: Area = 200 cm

Let the equal sides be a.



We know that,

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= 200 = \frac{1}{2} \times a \times a$$

$$= 200 = \frac{1}{2} \times a^2$$

$$= a^2 = 200 \times 2$$

$$= a^2 = 400$$

$$= a = 20 \text{ cm}$$

Now,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= 20^2 + 20^2 = \text{Hypotenuse}^2$$

$$= \text{Hypotenuse}^2 = 400 + 400$$

$$= \text{Hypotenuse}^2 = 800 \text{ cm}^2$$

$$= \text{Hypotenuse} = 20\sqrt{2} \text{ cm}$$

$$= \text{Hypotenuse} = 28.2 \text{ cm}$$

Now,

$$\text{Perimeter of triangle} = 20 + 20 + 28.2 \text{ cm}$$

$$= 68.2 \text{ cm}$$

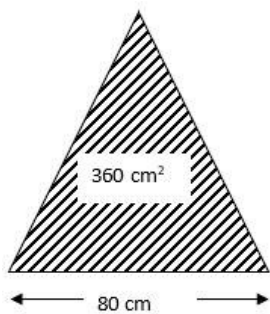
Question: 17

The base of an is

Solution:

$$\text{Given: Area of isosceles triangle} = 360 \text{ cm}^2$$

$$\text{Base of triangle} = 80 \text{ cm}$$



Let a be the equal sides of the triangle

We know that,

$$\text{Area of isosceles triangle} = \frac{1}{4} \times b \sqrt{4a^2 - b^2}$$

$$= 360 = \frac{1}{4} \times 80 \sqrt{4a^2 - 80^2}$$

$$= 360 = \frac{1}{4} \times 80 \sqrt{4a^2 - 6400}$$

$$= 360 = 20 \sqrt{4(a^2 - 1600)}$$

$$= 360 = 20 \times 2 \sqrt{a^2 - 1600}$$

$$\Rightarrow \frac{360}{20 \times 2} = \sqrt{a^2 - 1600}$$

$$= 9 = \sqrt{a^2 - 1600}$$

On squaring both sides we get,

$$= 81 = a^2 - 1600$$

$$= a^2 = 1600 + 81 = 1681$$

$$= a = 41 \text{ cm}$$

Now,

$$\text{Perimeter of triangle} = 41 \text{ cm} + 41 \text{ cm} + 80 \text{ cm}$$

$$= 162 \text{ cm}$$

Question: 18

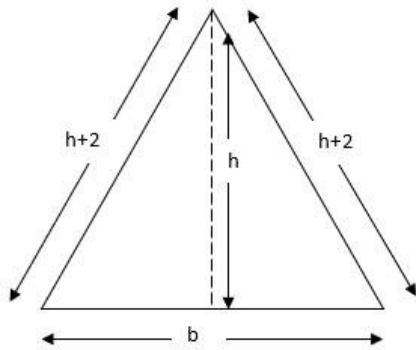
Each of the equal

Solution:

Let height of triangle = h cm

Given: Base of the triangle (b) = 12 cm

Equal sides (a) = $h + 2$ cm



Now,

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

And,

$$\text{Area of isosceles triangle} = \frac{1}{4} \times b\sqrt{4a^2 - b^2}$$

$$= \frac{1}{2} \times \text{Base} \times \text{Height} = \frac{1}{4} \times b\sqrt{4a^2 - b^2}$$

$$= \frac{1}{2} \times 12 \times h = \frac{1}{4} \times 12\sqrt{4(h+2)^2 - 12^2}$$

$$= 6h = 3\sqrt{4h^2 + 16h + 16 - 144}$$

$$= 2h = \sqrt{4h^2 + 16h - 128}$$

On squaring both sides we get,

$$= 4h^2 = 4h^2 + 16h - 128$$

$$= 16h - 128 = 0$$

$$= 16h = 128$$

$$\Rightarrow h = \frac{128}{16}$$

$$= h = 8 \text{ cm}$$

Now,

$$\text{Area of a triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 12 \text{ cm} \times 8 \text{ cm}$$

$$= \frac{1}{2} \times 96 \text{ cm}^2$$

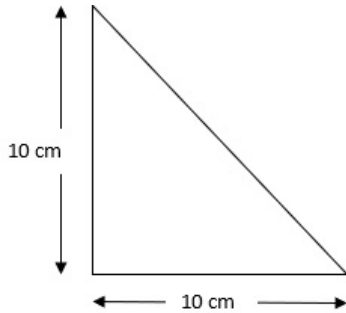
$$= 48 \text{ cm}^2$$

Question: 19

Find the area and

Solution:

Given: Equal sides (i.e., base and perpendicular) = 10 cm



We know that,

Area of a triangle = $\frac{1}{2} \times \text{Base} \times \text{Height}$

Area of a triangle = $\frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm}$

Area of a triangle = 50 cm^2

Now,

$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$

$= 10^2 + 10^2 = \text{Hypotenuse}^2$

$= \text{Hypotenuse}^2 = 100 + 100$

$= \text{Hypotenuse}^2 = 200 \text{ cm}^2$

$= \text{Hypotenuse} = 10\sqrt{2} \text{ cm}$

$= \text{Hypotenuse} = 14.1 \text{ cm}$

Now,

Perimeter of triangle = $10 + 10 + 14.1 \text{ cm}$

$= 24.1 \text{ cm}$

Question: 20

In the given figu

Solution:

Given: $AB = BC = AC = a$ (let) = 10 cm

$BD = 8 \text{ cm}$

Now,

Area of an equilateral triangle (ΔABC) = $\frac{\sqrt{3}}{4} \times a^2$

$= \frac{\sqrt{3}}{4} \times 10^2$

$= 25\sqrt{3} \text{ cm}^2$

$= 43.3 \text{ cm}^2$

Now, in ΔDBC

$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$

$= DC^2 + DB^2 = BC^2$

$$= DC^2 = BC^2 - BD^2$$

$$= DC^2 = 10^2 - 8^2$$

$$= DC^2 = 100 - 64$$

$$= DC^2 = 36 \text{ cm}^2$$

$$= DC = 6 \text{ cm}$$

Now,

$$\text{Area of a triangle } (\triangle DBC) = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times DC \times BC$$

$$= \frac{1}{2} \times 6 \text{ cm} \times 8 \text{ cm}$$

$$= \frac{1}{2} \times 48 \text{ cm}^2$$

$$= 24 \text{ cm}^2$$

Now,

$$\text{Area of shaded region} = \triangle ABC - \triangle DBC$$

$$= 43.3 \text{ cm}^2 - 24 \text{ cm}^2$$

$$= 19.3 \text{ cm}^2$$

Exercise : 17B

Question: 1

The perimeter of

Solution:

Given: Perimeter = 80 m

Breadth = 16 m



We know that,

$$\text{Perimeter of a rectangle} = 2(\text{length} + \text{breadth})$$

$$= 80 \text{ m} = 2(\text{length} + 16 \text{ m})$$

$$\Rightarrow \frac{80}{2} \text{ m} = \text{length} + 16 \text{ m}$$

$$= 40 \text{ m} = \text{length} + 16 \text{ m}$$

$$= \text{Length} = 40 \text{ m} - 16 \text{ m}$$

$$= \text{Length} = 24 \text{ m}$$

Now,

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth}$$

$$= 24 \text{ m} \times 16 \text{ m}$$

$$= 384 \text{ m}^2$$

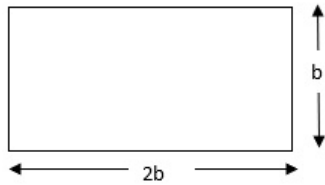
Question: 2

The length of a r

Solution:

Given: Length of park (l) = 2 × breadth(b) = 2b

Perimeter of park = 840 m



We know that,

Perimeter of a rectangle = 2(length + breadth)

$$= 840 \text{ m} = 2(2b + b)$$

$$\Rightarrow \frac{840}{2} \text{ m} = 2b + b$$

$$= 420 \text{ m} = 3b$$

$$\Rightarrow b = \frac{420}{3} \text{ m}$$

$$= b = 140 \text{ m}$$

Now,

$$l = 2b = 2 \times 140 \text{ m} = 280 \text{ m}$$

Hence,

Area of rectangle = Length × Breadth

$$= 140 \text{ m} \times 280 \text{ m}$$

$$= 39200 \text{ m}^2$$

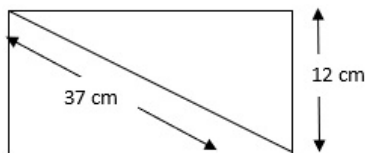
Question: 3

One side of a rec

Solution:

Given: Breadth (b) = 12 cm

Diagonal = 37 cm



Let length be l cm

We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$\Rightarrow l^2 + 12^2 = 37^2$$

$$\Rightarrow l^2 = 37^2 - 12^2$$

$$\Rightarrow l^2 = 1369 \text{ cm}^2 - 144 \text{ cm}^2$$

$$\Rightarrow l^2 = 1225 \text{ cm}^2$$

$$\Rightarrow l = 35 \text{ cm}$$

Now,

Area of rectangle = Length \times Breadth

$$= 35 \text{ cm} \times 12 \text{ cm}$$

$$= 420 \text{ cm}^2$$

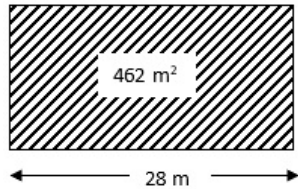
Question: 4

The area of a rec

Solution:

Given: Area = 462 m^2

Length = 28 m



We know that,

Area of rectangle = Length \times Breadth

$$= 462 \text{ m}^2 = 28 \text{ m} \times \text{Breadth}$$

$$\Rightarrow \text{Breadth} = \frac{462 \text{ m}^2}{28 \text{ m}}$$

$$= \text{Breadth} = 16.5 \text{ m}$$

Now,

Perimeter of a rectangle = $2(\text{length} + \text{breadth})$

$$= 2(28 \text{ m} + 16.5 \text{ m})$$

$$= 2 \times 44.5 \text{ m}$$

$$= 89 \text{ m}$$

Question: 5

A lawn is in the

Solution:

Given: Cost of fencing lawn = Rs 65 per metre.

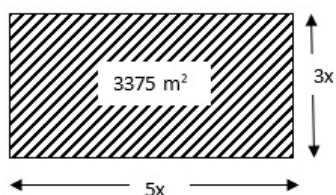
Area of lawn = 3375 m^2

Length: Breadth = 5: 3

Let,

Length = $5x$

Breadth = $3x$



We know that,

Area of lawn = Length \times Breadth

$$= 3375 \text{ m}^2 = 5x \times 3x$$

$$= 3375 \text{ m}^2 = 15x^2$$

$$\Rightarrow x^2 = \frac{3375}{15} \text{ m}^2$$

$$= x^2 = 225 \text{ m}^2$$

$$= x = 15 \text{ m}$$

Therefore,

$$\text{Length} = 5x = 5 \times 15 = 75 \text{ m}$$

$$\text{Breadth} = 3x = 3 \times 15 = 45 \text{ m}$$

Now,

$$\text{Perimeter of lawn} = 2(\text{length} + \text{breadth})$$

$$= 2(75 \text{ m} + 45 \text{ m})$$

$$= 2 \times 120 \text{ m}$$

$$= 240 \text{ m}$$

Hence,

$$\text{Cost of Fencing} = 240 \text{ m} \times \text{Rs } 65 \text{ per meter}$$

$$= \text{Rs } 15600$$

Question: 6

A room is 16 m lo

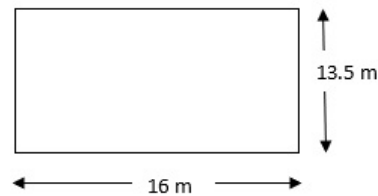
Solution:

Given: Cost of covering = Rs 60 per metre.

$$\text{Breadth of carpet} = 75 \text{ cm} = 0.75 \text{ m}$$

$$\text{Length of room} = 16 \text{ m}$$

$$\text{Breadth of room} = 13.5 \text{ m}$$



We know that,

$$\text{Area of room} = \text{Length} \times \text{Breadth}$$

$$= 16 \text{ m} \times 13.5 \text{ m}$$

$$= 216 \text{ m}^2$$

Now,

$$\text{Length of carpet} = \frac{\text{Area of room}}{\text{Breadth of carpet}}$$

$$= \frac{216 \text{ m}^2}{0.75 \text{ m}}$$

$$= 288 \text{ m}$$

Now,

$$\text{Cost of covering the floor} = 288 \text{ m} \times \text{Rs } 60 \text{ per meter}$$

$$= \text{Rs } 17280$$

Question: 7

The floor of a re

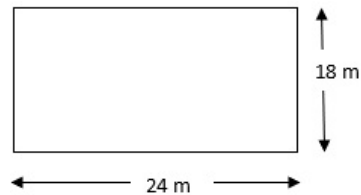
Solution:

Given: Length of carpet = 2.5 m

Breadth of carpet = 80 cm = 0.8 m

Length of hall = 24 m

Breadth of hall = 18 m



We know that,

Area of hall = Length \times Breadth

$$= 24 \text{ m} \times 18 \text{ m}$$

$$= 432 \text{ m}^2$$

And,

Area of carpet = Length \times Breadth

$$= 2.5 \text{ m} \times 0.8 \text{ m}$$

$$= 2 \text{ m}^2$$

Now,

$$\text{Number of carpets} = \frac{\text{Area of hall}}{\text{Area of carpet}}$$

$$= \frac{432 \text{ m}^2}{2 \text{ m}^2}$$

$$= 216 \text{ carpets}$$

Question: 8

A 36-m-long, 15-m

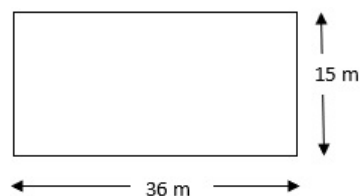
Solution:

Given: Length of verandah = 36 m

Breadth of verandah = 15 m

Length of stones = 6 dm = 0.6 m

Breadth of stones = 5 dm = 0.5 m



We know that,

Area of verandah = Length \times Breadth

$$= 36 \text{ m} \times 15 \text{ m}$$

$$= 540 \text{ m}^2$$

And,

$$\text{Area of stones} = \text{Length} \times \text{Breadth}$$

$$= 0.6 \text{ m} \times 0.5 \text{ m}$$

$$= 0.3 \text{ m}^2$$

Now,

$$\text{Number of stones} = \frac{\text{Area of verandah}}{\text{Area of stones}}$$

$$= \frac{540 \text{ m}^2}{0.3 \text{ m}^2}$$

$$= 1800 \text{ stones}$$

Question: 9

The area of a rec

Solution:

$$\text{Given: Area of rectangle} = 192 \text{ cm}^2$$

$$\text{Perimeter of rectangle} = 56 \text{ cm}$$



Let,

Length be l cm

And, breadth be b cm

Now,

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth}$$

$$\Rightarrow 192 \text{ cm}^2 = l \text{ cm} \times b \text{ cm}$$

$$\Rightarrow l \text{ cm} = \frac{192 \text{ cm}^2}{b \text{ cm}}$$

$$\text{Perimeter of rectangle} = 2(\text{length} + \text{breadth})$$

$$\Rightarrow 56 \text{ cm} = 2(l \text{ cm} + b \text{ cm})$$

Now, substituting the value of l in this we get,

$$56 = 2\left(\frac{192}{b} + b\right)$$

$$\Rightarrow 56 = 2\left(\frac{192 + b^2}{b}\right)$$

$$\Rightarrow \frac{56}{2} = \frac{192 + b^2}{b}$$

$$\Rightarrow 28 = \frac{192 + b^2}{b}$$

$$\Rightarrow 28b = 192 + b^2$$

$$\Rightarrow b^2 - 28b + 192 = 0$$

$$\Rightarrow b^2 - 16b - 12b + 192 = 0$$

$$\Rightarrow b(b - 16) - 12(b - 16) = 0$$

$$\Rightarrow (b - 12)(b - 16) = 0$$

This gives us two equations,

$$\text{i. } b - 12 = 0$$

$$\Rightarrow b = 12$$

$$\text{ii. } b - 16 = 0$$

$$\Rightarrow b = 16$$

Let $b = 12$ cm

$$\Rightarrow l \text{ cm} = \frac{192 \text{ cm}^2}{12 \text{ cm}} = 16 \text{ cm}$$

Hence,

Length = 16 cm

Breadth = 12 cm

Question: 10

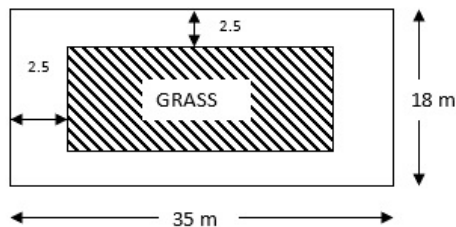
A rectangular park

Solution:

Given:

Length of park = 35 m

Breadth of park = 18 m



Now,

$$\text{Length to be covered} = 35 - (2.5 + 2.5)$$

$$= 30 \text{ m}$$

$$\text{Breadth to be covered} = 18 - (2.5 + 2.5)$$

$$= 13 \text{ m}$$

$$\text{Area of park} = \text{Length} \times \text{Breadth}$$

$$= 30 \text{ m} \times 13 \text{ m}$$

$$= 390 \text{ m}^2$$

Question: 11

A rectangular plot

Solution:

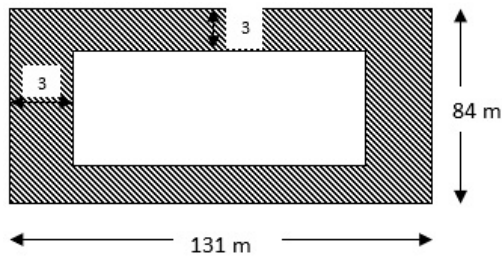
Given: Length of plot = 125 m and Breadth of plot = 78 m. It has a gravel path 3 m wide all around on the outside. **To find:** The area of the path and the cost of gravelling it at RS. 75 per

m².

Solution: Since gravel path is 3 m wide all around,

∴ Length of plot with path = $125 + (3 + 3) = 131$ m

Breadth of plot with path = $78 + (3 + 3) = 84$ m



Now,

Area of the rectangular plot without path = $L \times B \Rightarrow$ Area of the rectangular plot without path =

$125 \times 78 = 9750$ m² Area of rectangular plot with path = $L \times B \Rightarrow$ Area of the rectangular plot

with path = $131 \times 84 = 11004$ m² Area of the path = Area of the rectangular plot with path -

Area of the rectangular plot without path = $11004 - 9750$

= 1254 m² Cost of gravelling 1 m² path = Rs 75 Cost of gravelling 1254 m² path = Rs 75×1254

= Rs 94050

Question: 12

A footpath of uni

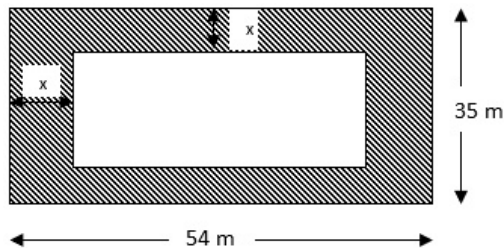
Solution:

Given:

Length of field = 54 m

Breadth of field = 35 m

Let width of the path be x m



Area of field = Length \times Breadth

= $54 \text{ m} \times 35 \text{ m}$

= 1890 m²

Therefore,

Length of field without path = $54 - (x + x)$

= $54 - 2x$

Breadth of field without path = $35 - (x + x)$

= $35 - 2x$

Therefore,

Area of field without path = Length without path \times Breadth without path

= $(54 - 2x) \times (35 - 2x)$

= $1890 - 70x - 108x + 4x^2$

$$= 1890 - 178x + 4x^2$$

Now,

Area of path = Area of field - Area of field without path

$$\Rightarrow 420 = 1890 - (1890 - 178x + 4x^2)$$

$$= 420 = 1890 - 1890 + 178x - 4x^2$$

$$\Rightarrow 420 = 178x - 4x^2$$

$$\Rightarrow 4x^2 - 178x + 420 = 0$$

$$\Rightarrow 2x^2 - 89x + 210 = 0$$

$$\Rightarrow 2x^2 - 84x - 5x + 210 = 0$$

$$\Rightarrow 2x(x - 42) - 5(x - 42) = 0$$

$$\Rightarrow (x - 42)(2x - 5) = 0$$

This gives us two equations,

$$\text{i. } x - 42 = 0$$

$$\Rightarrow x = 42$$

$$\text{ii. } 2x - 5 = 0$$

$$\Rightarrow x = \frac{5}{2}$$

Since, width of park cannot be more than breadth of field

Therefore, width of park = 42 m

Question: 13

The length and th

Solution:

Given:

Length : Breadth 9 : 5

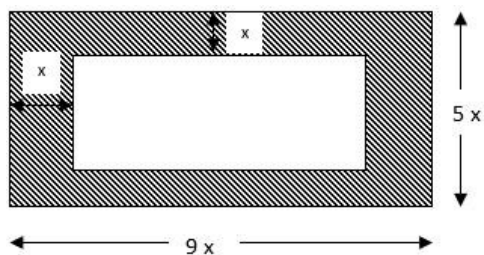
Width of the path = 3.5 m

Area of path = 1911 m²

Let,

Length of field = 9x

Breadth of field = 5x



Area of field = Length \times Breadth

$$= 9x \times 5x$$

$$= 45x^2$$

Therefore,

$$\text{Length of field without path} = 9x - (3.5 + 3.5)$$

$$= 9x - 7$$

$$\text{Breadth of field without path} = 5x - (3.5 + 3.5)$$

$$= 5x - 7$$

Therefore,

$$\text{Area of field without path} = \text{Length without path} \times \text{Breadth without path}$$

$$= (9x - 7) \times (5x - 7)$$

$$= 45x^2 - 35x - 63x + 49$$

$$= 45x^2 - 98x + 49$$

Now,

$$\text{Area of path} = \text{Area of field} - \text{Area of field without path}$$

$$= 1911 = 45x^2 - (45x^2 - 98x + 49)$$

$$= 1911 = 45x^2 - 45x^2 + 98x - 49$$

$$= 1911 = 98x - 49$$

$$= 98x = 1911 + 49$$

$$= 98x = 1960$$

$$= x = 20$$

Hence,

$$\text{Length of field} = 9x = 9 \times 20 = 180 \text{ m}$$

$$\text{Breadth of field} = 5x = 5 \times 20 = 100 \text{ m}$$

Question: 14

A room 4.9 m long

Solution:

Given:

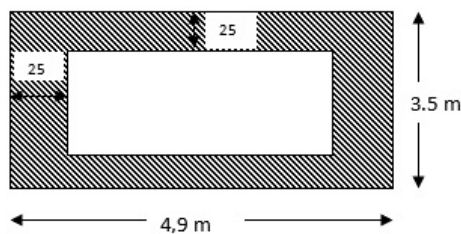
$$\text{Length} = 4.9 \text{ m}$$

$$\text{Breadth} = 3.5 \text{ m}$$

$$\text{Margin} = 25 \text{ cm} = 0.25 \text{ m}$$

$$\text{Breadth of carpet} = 80 \text{ cm} = 0.8 \text{ m}$$

$$\text{Cost} = \text{Rs } 80 \text{ per meter}$$



Now,

$$\text{Length to be carpeted} = 4.9 \text{ m} - (0.25 + 0.25) \text{ m}$$

$$= 4.4 \text{ m}$$

$$\text{Breadth to be carpeted} = 3.5 \text{ m} - (0.25 + 0.25) \text{ m}$$

$$= 3 \text{ m}$$

Therefore,

Area to be carpeted = Length to be carpeted \times Breadth to be carpeted

$$= 4.4 \text{ m} \times 3 \text{ m}$$

$$= 13.2 \text{ m}^2$$

Area of carpet = Area to be carpeted = 13.2 m^2

Now,

$$\text{Length of carpet} = \frac{\text{Area of carpet}}{\text{Breadth of carpet}}$$

$$\text{Length of carpet} = \frac{13.2 \text{ m}^2}{0.8 \text{ m}}$$

$$= 16.5 \text{ m}$$

Now,

Cost of 1 m carpet = Rs 80

Therefore,

Cost of 16.5 m carpet = Rs 80 \times 16.5 m

$$= \text{Rs } 1,320$$

Question: 15

A carpet is laid

Solution:

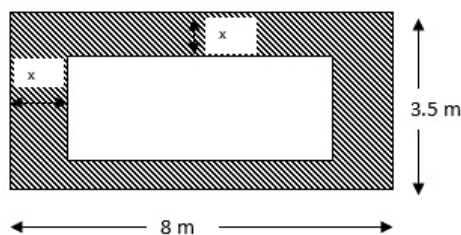
Given:

Length = 8 m

Breadth = 5 m

Border = 12 m^2

Let the width be $x \text{ m}$



Area of floor = Length \times Breadth

$$= 8 \text{ m} \times 5 \text{ m}$$

$$= 40 \text{ m}^2$$

Now,

Length without border = $8 \text{ m} - (x + x) \text{ m}$

$$= (8 - 2x) \text{ m}$$

Breadth without border = $5 \text{ m} - (x + x) \text{ m}$

$$= (5 - 2x) \text{ m}$$

Therefore,

Area without border = Length without border \times Breadth without border

$$= (8 - 2x) \times (5 - 2x)$$

$$= 40 - 16x - 10x + 4x^2$$

Area of border = Area of floor - Area without border

$$\Rightarrow 12 = 40 - (40 - 16x - 10x + 4x^2)$$

$$\Rightarrow 12 = 40 - 40 + 16x + 10x - 4x^2$$

$$\Rightarrow 12 = 26x - 4x^2$$

$$\Rightarrow 4x^2 - 26x + 12 = 0$$

$$\Rightarrow 4x^2 - 24x - 2x + 12 = 0$$

$$\Rightarrow 4x(x - 6) - 2(x - 6) = 0$$

$$\Rightarrow (x - 6)(4x - 2) = 0$$

This gives us two equations,

$$\text{i. } x - 6 = 0$$

$$\Rightarrow x = 6$$

$$\text{ii. } 4x - 2 = 0$$

$$\Rightarrow x = 1/2$$

Since,

Border cannot be greater than carpet

Hence, width of border is $1/2 \text{ m} = 50 \text{ cm}$

Question: 16

A 80 m by 64 m re

Solution:

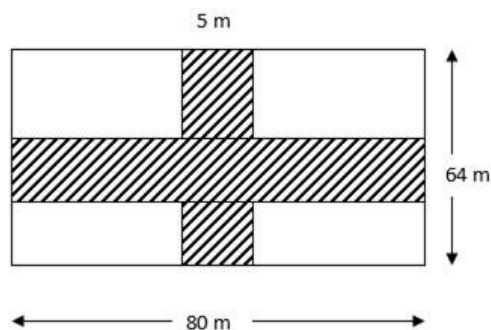
Given: A 80 m by 64 m rectangular lawn has two roads, each 5 m wide, running through its middle, one parallel to its length and the other parallel to its breadth. **To find:** The cost of gravelling the roads at RS. 40 per m^2 .

Solution:

Length = 80 m

Breadth = 64 m

Width of road = 5 m



$$\text{Area of horizontal road} = 5 \text{ m} \times 80 \text{ m} = 400 \text{ m}^2$$

$$\text{Area of vertical road} = 5 \text{ m} \times 64 \text{ m} = 320 \text{ m}^2$$

$$\text{Area of common part to both roads} = 5 \text{ m} \times 5 \text{ m} = 25 \text{ m}^2$$

Now,

Area of roads to be gravelled = Area of horizontal road + Area of vertical road - Area of common part to both roads

$$= 400 \text{ m}^2 + 320 \text{ m}^2 - 25 \text{ m}^2$$

$$= 695 \text{ m}^2$$

$$\text{Cost of gravelling} = 695 \text{ m}^2 \times \text{Rs } 40 \text{ per m}^2$$

$$= \text{Rs } 27800$$

Question: 17

The dimensions of

Solution:

Given:

Length of walls = 14 m

Breadth of walls = 10 m

Height of walls = 6.5 m

Length of windows = 1.5 m

Breadth of windows = 1 m

Length of doors = 2.5 m

Breadth of doors = 1.2 m

Cost = Rs 35 per m²

Now,

Area of four walls = 2(Length of walls × Height of walls) + 2(Breadth of walls × Height of walls)

$$= 2(14 \times 6.5) + 2(10 \times 6.5)$$

$$= 182 \text{ m}^2 + 130 \text{ m}^2$$

$$= 312 \text{ m}^2$$

Area of two doors = 2(Length of doors × Breadth of doors)

$$= 2(2.5 \times 1.2)$$

$$= 6 \text{ m}^2$$

Area of four windows = 4(Length of windows × Breadth of windows)

$$= 4(1.5 \times 1)$$

$$= 6 \text{ m}^2$$

Therefore,

Area to be painted = Area of 4 walls - (Area of 2 doors + Area of 4 windows)

$$= 312 \text{ m}^2 - (6 \text{ m}^2 + 6 \text{ m}^2)$$

$$= 300 \text{ m}^2$$

$$\text{Cost of painting} = 300 \text{ m}^2 \times \text{Rs } 35 \text{ per m}^2$$

$$= \text{Rs } 10500$$

Question: 18

The cost of paint

Solution:

Given:

Length = 12 m

Cost per meter = Rs 30

Total cost = Rs 7560

Cost per meter for floor = Rs 25

Total cost for floor = Rs 2700

Let height be h

Now,

$$\text{Area of the floor} = \frac{\text{Total cost}}{\text{Cost per meter}}$$

$$= \frac{2700}{25}$$

$$= 108 \text{ m}^2$$

$$\text{Breadth} = \frac{\text{Area of the floor}}{\text{Length}}$$

$$= \frac{108}{12}$$

$$= 9 \text{ m}$$

$$\text{Area of walls} = \frac{\text{Total cost}}{\text{Cost per meter}}$$

$$= \frac{7560}{30}$$

$$= 252 \text{ m}^2$$

Area of 4 walls = 2(Length of walls × Height of walls) + 2(Breadth of walls × Height of walls)

$$= 252 = 2(12 \times h) + 2(9 \times h)$$

$$= 252 = 24h + 18h$$

$$= 252 = 42h$$

$$= h = 6 \text{ m}$$

Therefore,

Dimensions = 12 m × 9 m × 6 m

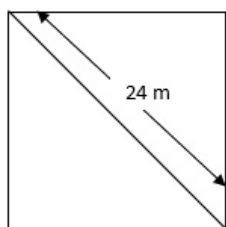
Question: 19

Find the area and

Solution:

Given:

Diagonal = 24 m



Let the side of square be s

$$\text{Area of square} = \frac{1}{2} \times \text{Diagonal}^2$$

$$= \frac{1}{2} \times 24^2$$

$$= 288 \text{ m}^2$$

$$\text{Area of square} = \text{side}^2$$

$$= 288 \text{ m}^2 = s^2$$

$$\Rightarrow s = 12\sqrt{2} \text{ m}$$

$$\Rightarrow s = 16.92 \text{ m}$$

Therefore,

$$\text{Perimeter of square} = 4 \times 16.92$$

$$= 67.68 \text{ m}$$

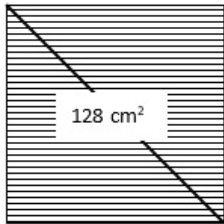
Question: 20

Find the length o

Solution:

Given:

$$\text{Area} = 128 \text{ cm}^2$$



Let the side of square be s

$$\text{Area of square} = \frac{1}{2} \times \text{Diagonal}^2$$

$$\Rightarrow 128 = \frac{1}{2} \times \text{Diagonal}^2$$

$$\Rightarrow \text{Diagonal}^2 = 2 \times 128$$

$$\Rightarrow \text{Diagonal}^2 = 256$$

$$\Rightarrow \text{Diagonal} = 16 \text{ cm}$$

$$\text{Area of square} = \text{side}^2$$

$$\Rightarrow 128 \text{ m}^2 = s^2$$

$$\Rightarrow s = 8\sqrt{2} \text{ cm}$$

$$\Rightarrow s = 11.28 \text{ cm}$$

Therefore,

$$\text{Perimeter of square} = 4 \times 11.28$$

$$= 45.12 \text{ cm}$$

Question: 21

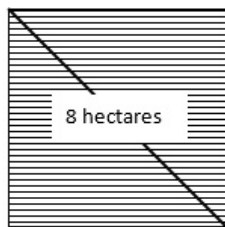
The area of a squ

Solution:

Given:

$$\text{Area} = 8 \text{ hectares} = 0.08 \text{ km}^2$$

$$\text{Speed} = 4 \text{ km per hr}$$



Let the side of square be s

$$\text{Area of square} = \frac{1}{2} \times \text{Diagonal}^2$$

$$= 0.08 = \frac{1}{2} \times \text{Diagonal}^2$$

$$\Rightarrow \text{Diagonal}^2 = 2 \times 0.08$$

$$\Rightarrow \text{Diagonal}^2 = 0.16$$

$$\Rightarrow \text{Diagonal} = 0.04 \text{ km}$$

$$\text{Time taken} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{0.04 \text{ km}}{4 \text{ km per hr}}$$

$$= 0.01 \text{ hr}$$

$$= (0.01 \times 60) \text{ mins}$$

$$= 6 \text{ mins}$$

Therefore,

$$\text{Time taken} = 6 \text{ mins}$$

Question: 22

The cost of harve

Solution:

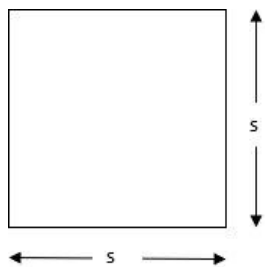
Given:

Rate = Rs 900 per hectare

Total Cost = Rs 8100

Rate of fencing = Rs 18 per metre

Let the side of square field be s



Now,

$$\text{Area} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$= \frac{8100}{900}$$

$$= 9 \text{ hectares} = 90000 \text{ m}^2$$

$$\text{Area} = \text{side}^2$$

$$= 90000 \text{ m}^2 = \text{side}^2$$

$$\Rightarrow \text{side} = 300 \text{ m}^2$$

Now,

$$\text{Perimeter} = 4 \times \text{side}$$

$$= 4 \times 300 \text{ m}^2$$

$$= 1200 \text{ m}^2$$

Therefore,

$$\text{Cost of fencing} = 1200 \text{ m}^2 \times \text{Rs } 18 \text{ per metre}$$

$$= \text{Rs } 21600$$

Question: 23

The cost of fenci

Solution:

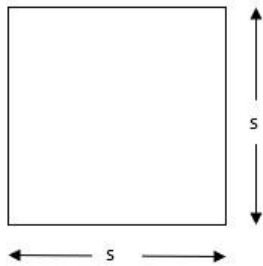
Given:

$$\text{Rate} = \text{RS. } 14 \text{ per metre}$$

$$\text{Total Cost} = \text{RS. } 28000$$

$$\text{Rate of mowing} = \text{RS. } 54 \text{ per } 100 \text{ m}^2$$

Let the side of square field be s



Now,

$$\text{Perimeter} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$= \frac{28000}{14}$$

$$= 2000 \text{ m}$$

$$\text{Perimeter} = 4 \times \text{side}$$

$$\Rightarrow 2000 \text{ m} = 4 \times s$$

$$\Rightarrow s = \frac{2000}{4}$$

$$\Rightarrow s = 500 \text{ m}$$

Now,

$$\text{Area} = \text{side}^2$$

$$= (500 \text{ m})^2$$

$$= 250000 \text{ m}^2$$

Therefore,

$$\text{Cost of mowing } 100 \text{ m}^2 = \text{Rs } 54$$

$$\text{Cost of mowing } 1 \text{ m}^2 = \text{Rs } \frac{54}{100}$$

$$\text{Cost of mowing } 250000 \text{ m}^2 = \text{Rs } \frac{54}{100} \times 250000$$

$$= \text{Rs } 135000$$

Question: 24

In the given figu

Solution:

Given:

$$BD = 24 \text{ cm}$$

$$AL = 9 \text{ cm}$$

$$CM = 12 \text{ cm}$$

In $\triangle ADB$,

$$\text{Area of } \triangle ADB = \frac{1}{2} \times BD \times AL$$

$$= \frac{1}{2} \times 24 \text{ cm} \times 9 \text{ cm}$$

$$= 108 \text{ cm}^2$$

In $\triangle CDB$,

$$\text{Area of } \triangle CDB = \frac{1}{2} \times BD \times CM$$

$$= \frac{1}{2} \times 24 \text{ cm} \times 12 \text{ cm}$$

$$= 144 \text{ cm}^2$$

Now,

$$\text{Area of quadrilateral } ABCD = \text{Area of } \triangle ADB + \text{Area of } \triangle CDB$$

$$= 108 \text{ cm}^2 + 144 \text{ cm}^2$$

$$= 252 \text{ cm}^2$$

Question: 25

Find the area of

Solution:

Given:

$$BC = 26 \text{ cm}$$

$$DC = 26 \text{ cm}$$

$$AD = 24 \text{ cm}$$

$$BD = 26 \text{ cm}$$

In $\triangle BCD$,

$$\text{Area of } \triangle BCD(\text{equilateral}) = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 26^2$$

$$= 292.37 \text{ cm}^2$$

In $\triangle ADB$,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= AB^2 + AD^2 = DB^2$$

$$= AB^2 = DB^2 - AD^2$$

$$= AB^2 = 26^2 - 24^2$$

$$= AB^2 = 676 - 576$$

$$= AB^2 = 100$$

$$= AB = 10 \text{ cm}$$

$$\text{Area of } \triangle ADB = \frac{1}{2} \times AB \times AD$$

$$= \frac{1}{2} \times 10 \text{ cm} \times 24 \text{ cm}$$

$$= 120 \text{ cm}^2$$

Now,

$$\text{Area of quadrilateral ABCD} = \text{Area of } \triangle ADB + \text{Area of } \triangle BCD$$

$$= 120 \text{ cm}^2 + 292.37 \text{ cm}^2$$

$$= 412.37 \text{ cm}^2$$

And,

$$\text{Perimeter of quadrilateral ABCD} = AB + BC + CD + DA$$

$$= 10 \text{ cm} + 26 \text{ cm} + 26 \text{ cm} + 24 \text{ cm}$$

$$= 86 \text{ cm}$$

Question: 26

Find the perimeter

Solution:

Given:

$$AC = 15 \text{ cm}$$

$$AB = 17 \text{ cm}$$

$$AD = 9 \text{ cm}$$

$$CD = 12 \text{ cm}$$

In $\triangle ACB$ (right-angled),

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= BC^2 + AC^2 = AB^2$$

$$= BC^2 = AB^2 - AC^2$$

$$= BC^2 = 17^2 - 15^2$$

$$= BC^2 = 289 - 225$$

$$= BC^2 = 64$$

$$= BC = 8 \text{ cm}$$

$$\text{Area of } \triangle ACB = \frac{1}{2} \times BC \times AC$$

$$= \frac{1}{2} \times 8 \text{ cm} \times 15 \text{ cm}$$

$$= 60 \text{ cm}^2$$

In $\triangle ADC$,

$$\text{Area of } \triangle ADC = \frac{1}{2} \times AD \times CD$$

$$= \frac{1}{2} \times 9 \text{ cm} \times 12 \text{ cm}$$

$$= 54 \text{ cm}^2$$

Now,

$$\text{Area of quadrilateral ABCD} = \text{Area of } \triangle ACB + \text{Area of } \triangle ADC$$

$$= 60 \text{ cm}^2 + 54 \text{ cm}^2$$

$$= 114 \text{ cm}^2$$

And,

$$\text{Perimeter of quadrilateral ABCD} = AB + BC + CD + DA$$

$$= 17 \text{ cm} + 8 \text{ cm} + 12 \text{ cm} + 9 \text{ cm}$$

$$= 46 \text{ cm}$$

Question: 27

Find the area of

Solution:

Given:

$$DB = 20 \text{ cm}$$

$$AB = 42 \text{ cm}$$

$$AD = 34 \text{ cm}$$

$$CD = 29 \text{ cm}$$

$$CB = 21 \text{ cm}$$

In $\triangle ABD$ (scalene),

$$\text{Area of a scalene triangle} = \sqrt{s(s-AB)(s-BD)(s-AD)}$$

$$\text{Where, } s = \frac{AB + BD + AD}{2}$$

$$s = \frac{42 + 20 + 34}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$= s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48 \text{ cm} \times (48-42) \text{ cm} \times (48-20) \text{ cm} \times (48-34) \text{ cm})}$$

$$= \sqrt{(48 \text{ cm} \times 6 \text{ cm} \times 28 \text{ cm} \times 14 \text{ cm})}$$

$$= \sqrt{112896 \text{ cm}^2}$$

$$= 336 \text{ cm}^2$$

Similarly,

In $\triangle BCD$ (scalene),

$$\text{Area of a scalene triangle} = \sqrt{s(s-BC)(s-CD)(s-BD)}$$

$$\text{Where, } s = \frac{BC + BD + CD}{2}$$

$$s = \frac{29 + 20 + 21}{2} \text{ cm}$$

$$\Rightarrow s = \frac{70}{2} \text{ cm}$$

$$\Rightarrow s = 35 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(35 \text{ cm} \times (35-29) \text{ cm} \times (35-20) \text{ cm} \times (35-21) \text{ cm})}$$

$$= \sqrt{(35 \text{ cm} \times 6 \text{ cm} \times 15 \text{ cm} \times 14 \text{ cm})}$$

$$= \sqrt{44100 \text{ cm}^2}$$

$$= 210 \text{ cm}^2$$

Now,

$$\text{Area of quadrilateral ABCD} = \text{Area of } \triangle ABD + \text{Area of } \triangle BCD$$

$$= 336 \text{ cm}^2 + 210 \text{ cm}^2$$

$$= 546 \text{ cm}^2$$

Question: 28

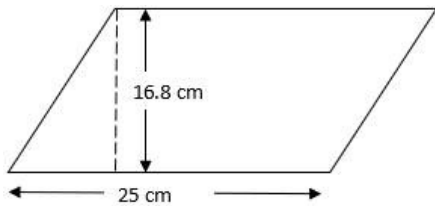
Find the area of

Solution:

Given:

$$\text{Base} = 25 \text{ cm}$$

$$\text{Height} = 16.8 \text{ cm}$$



Now,

$$\text{Area of parallelogram} = \text{Base} \times \text{Height}$$

$$= 25 \text{ cm} \times 16.8 \text{ cm}$$

$$= 420 \text{ cm}^2$$

Question: 29

The adjacent side

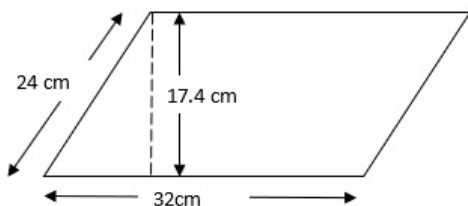
Solution:

Given:

$$\text{Longer side} = 32 \text{ cm}$$

$$\text{Shorter side} = 24 \text{ cm}$$

$$\text{Distance between Longer sides} = 17.4 \text{ cm}$$



Now,

Area of parallelogram = Longer side \times Distance between Longer sides

$$= 32 \text{ cm} \times 17.4 \text{ cm}$$

$$= 556.8 \text{ cm}^2$$

Also,

Area of parallelogram = Shorter side \times Distance between Shorter sides

$$= 556.8 \text{ cm}^2 = 24 \text{ cm} \times x \text{ cm}$$

$$\Rightarrow x = \frac{556.8}{24}$$

$$= x = 23.2 \text{ cm}$$

Hence,

Distance between Shorter sides = 23.2 cm

Question: 30

The area of a par

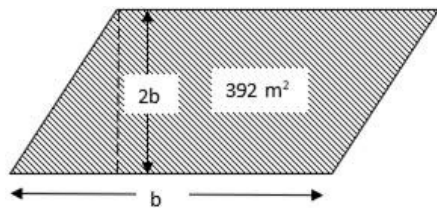
Solution:

Given:

$$\text{Area} = 392 \text{ m}^2$$

$$\text{Base} = b \text{ (let)}$$

$$\text{Height} = 2b$$



Now,

Area of parallelogram = Base \times Height

$$= 392 = b \times 2b$$

$$= 392 = 2b^2$$

$$= b^2 = 196$$

$$= b = 14 \text{ cm}$$

Hence,

$$\text{Base} = 14 \text{ cm}$$

$$\text{Altitude} = 2 \times 14 = 28 \text{ cm}$$

Question: 31

The adjacent side

Solution:

Given:

$$AB = 34 \text{ cm}$$

$$BC = 20 \text{ cm}$$

$$AC = 42 \text{ cm}$$

In $\triangle ABC$ (scalene),

$$\text{Area of } \triangle ABC = \sqrt{s(s-AB)(s-BC)(s-AC)}$$

$$\text{Where, } s = \frac{AB+BC+AC}{2}$$

$$s = \frac{42 + 20 + 34}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$\Rightarrow s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48\text{cm} \times (48-42)\text{cm} \times (48-20)\text{cm} \times (48-34)\text{cm})}$$

$$= \sqrt{(48 \text{ cm} \times 6 \text{ cm} \times 28 \text{ cm} \times 14 \text{ cm})}$$

$$= \sqrt{112896 \text{ cm}^2}$$

$$= 336 \text{ cm}^2$$

Now,

$$\text{Area of parallelogram ABCD} = 2 \times \text{Area of } \triangle ABC$$

$$= 2 \times 336 \text{ cm}^2$$

$$= 672 \text{ cm}^2$$

Question: 32

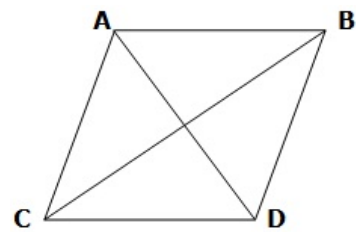
Find the area of

Solution:

Given:

$$\text{Length of diagonal 1 (d}_1\text{)} = 30 \text{ cm}$$

$$\text{Length of diagonal 2 (d}_2\text{)} = 16 \text{ cm}$$



$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 30 \text{ cm} \times 16 \text{ cm}$$

$$= 240 \text{ cm}^2$$

Now,

$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(d_1^2 + d_2^2)}$$

$$= \frac{1}{2} \times \sqrt{(30^2 + 16^2)}$$

$$= \frac{1}{2} \times \sqrt{(900 + 256)}$$

$$= \frac{1}{2} \times \sqrt{1156}$$

$$= \frac{1}{2} \times 34$$

$$= 17 \text{ cm}$$

Therefore,

$$\text{Perimeter of rhombus} = 4 \times \text{Side of rhombus}$$

$$= 4 \times 17 \text{ cm}$$

$$= 68 \text{ cm}$$

Question: 33

The perimeter of

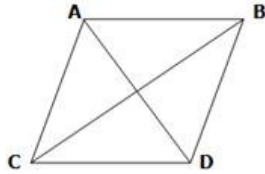
Solution:

Given:

Perimeter of rhombus = 60 cm

Length of diagonal 1 (d_1) = 18 cm

Let, Length of diagonal 2 be d_2



(i) Perimeter of rhombus = $4 \times \text{side}$

$$= 60 = 4 \times \text{side}$$

$$\Rightarrow \text{side} = \frac{60}{4} = 15 \text{ cm}$$

Now,

$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(d_1)^2 + (d_2)^2}$$

$$= 15 = \frac{1}{2} \times \sqrt{(18)^2 + (d_2)^2}$$

$$= 15 = \frac{1}{2} \times \sqrt{(324 + d_2^2)}$$

$$= 15 \times 2 = \sqrt{(324 + d_2^2)}$$

$$= 30 = \sqrt{(324 + d_2^2)}$$

Squaring both sides,

$$= 900 = 324 + d_2^2$$

$$= 900 - 324 = d_2^2$$

$$= d_2^2 = 576$$

$$= d_2 = 24$$

Therefore,

Length of other diagonal = 24 cm

(ii) Area of rhombus = $\frac{1}{2} \times d_1 \times d_2$

$$= \frac{1}{2} \times 18 \text{ cm} \times 24 \text{ cm}$$

$$= 216 \text{ cm}^2$$

Question: 34

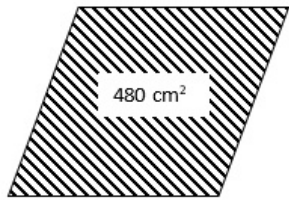
The area of a rho

Solution:

Given:

$$\text{Area of rhombus} = 480 \text{ cm}^2$$

$$\text{Length of diagonal 1 (d}_1\text{)} = 48 \text{ cm}$$



Let, Length of diagonal 2 be d_2

$$(i) \text{ Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$\Rightarrow 480 = \frac{1}{2} \times 48 \times d_2$$

$$\Rightarrow d_2 = \frac{480 \times 2}{48}$$

$$\Rightarrow d_2 = 20 \text{ cm}$$

Therefore,

$$\text{Length of other diagonal} = 20 \text{ cm}$$

$$(ii) \text{ Side of rhombus} = \frac{1}{2} \times \sqrt{(48^2 + 20^2)}$$

$$= \frac{1}{2} \times \sqrt{(2304 + 400)}$$

$$= \frac{1}{2} \times \sqrt{2704}$$

$$= \frac{1}{2} \times 52$$

$$= 26 \text{ cm}$$

Therefore,

$$\text{Side of rhombus} = 26 \text{ cm}$$

$$(iii) \text{ Perimeter of rhombus} = 4 \times \text{side}$$

$$= 4 \times 26 \text{ cm}$$

$$= 104 \text{ cm}$$

Therefore,

$$\text{Perimeter of rhombus} = 104 \text{ cm}$$

Question: 35

The parallel side

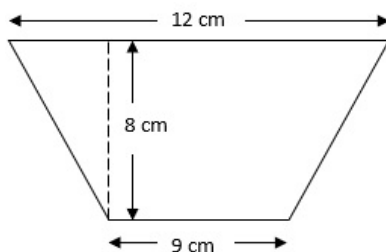
Solution:

Given:

$$\text{Side 1} = 12 \text{ cm}$$

$$\text{Side 2} = 9 \text{ cm}$$

$$\text{Distance between sides} = 8 \text{ cm}$$



Now,

Area of trapezium = $\frac{1}{2} \times \text{Sum of parallel sides} \times \text{Distance between them}$

$$= \frac{1}{2} \times (12 + 9) \times 8$$

$$= \frac{1}{2} \times 21 \times 8$$

$$= 84 \text{ cm}^2$$

Question: 36

The shape of the

Solution:

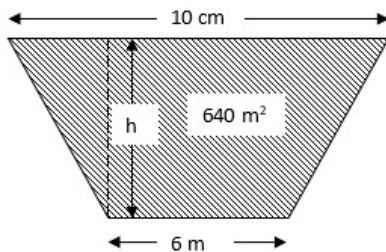
Given:

Top width = 10 m

Bottom width = 6 m

Area of cross section = 640 m^2

Let the depth be h



Now,

Area of trapezium = $\frac{1}{2} \times \text{Sum of parallel sides} \times \text{Distance between them}$

$$= 640 = \frac{1}{2} \times (10 + 6) \times h$$

$$= 640 \times 2 = 16 h$$

$$\Rightarrow h = \frac{640 \times 2}{16}$$

$$= h = 80 \text{ m}$$

Question: 37

Find the area of

Solution:

Given:

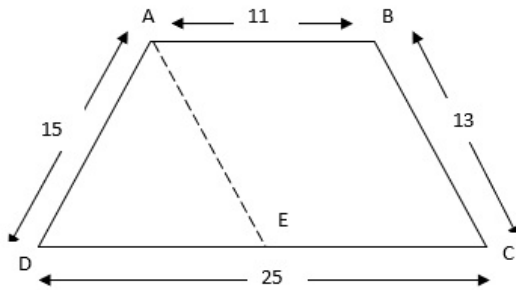
AB (say) = 11 cm

DC (say) = 25 cm

AD (say) = 15 cm

BC (say) = 13 cm

Draw $AE \parallel BC$



Now the trapezium is divided into a triangle ADE and a parallelogram AECB.

Since, AECB is a parallelogram

Therefore, $AE = BC = 13 \text{ cm}$

And, $AB = EC$

$DE = DC - EC (= AB) = 25 - 11 = 14 \text{ cm}$

Now,

We know that,

Area of a scalene triangle (ΔAED) = $\sqrt{(s(s-AE)(s-ED)(s-AD))}$

Where, $s = \frac{AE + ED + AD}{2}$

$$s = \frac{13 + 14 + 15}{2} \text{ cm}$$

$$\Rightarrow s = \frac{42}{2} \text{ cm}$$

$$\Rightarrow s = 21 \text{ cm}$$

Now,

Area of a scalene triangle = $\sqrt{(21\text{cm} \times (21-13)\text{cm} \times (21-14)\text{cm} \times (21-15)\text{cm})}$

$$= \sqrt{(21\text{cm} \times 8\text{cm} \times 7\text{cm} \times 6\text{cm})}$$

$$= \sqrt{7056 \text{ cm}^2}$$

$$= 84 \text{ cm}^2$$

Also,

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$\Rightarrow 84 = \frac{1}{2} \times 14 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{84 \times 2}{14}$$

$$\Rightarrow \text{height} = 12 \text{ cm}$$

Now,

Area of a parallelogram = $\text{base} \times \text{height}$

$$= 11 \text{ cm} \times 12 \text{ cm}$$

$$= 132 \text{ cm}^2$$

Now,

Area of Trapezium ABCD = Area of ΔADE + Area of a parallelogram ABCE

$$= 84 \text{ cm}^2 + 132 \text{ cm}^2$$

$$= 216 \text{ cm}^2$$

Exercise : MULTIPLE CHOICE QUESTIONS (MCQ)

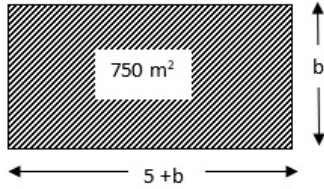
Question: 1

The length of a r

Solution:

Given: Length of hall (l) = 5 + breadth(b) = 5 + b

Area of hall = 750 m²



We know that,

Area of rectangle = Length \times Breadth

$$\Rightarrow 750 = (5 + b) \times b$$

$$\Rightarrow 750 = b^2 + 5b$$

$$\Rightarrow b^2 + 5b - 750 = 0$$

$$\Rightarrow b^2 + 30b - 25b - 750 = 0$$

$$\Rightarrow b(b + 30) - 25(b + 30) = 0$$

$$\Rightarrow (b + 30)(b - 25) = 0$$

This gives us two equations,

i. $b + 30 = 0$

$$\Rightarrow b = -30$$

ii. $b - 25 = 0$

$$\Rightarrow b = 25$$

Since, the length of the rectangle cannot be negative

Therefore, $b = 25$ m

$$\Rightarrow l = (b + 5) \text{ m}$$

$$\Rightarrow l = (25 + 5) \text{ m}$$

$$\Rightarrow l = 30 \text{ m}$$

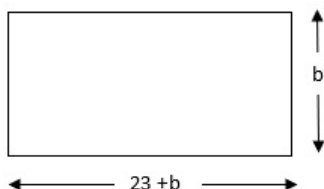
Question: 2

The length of a r

Solution:

Given: Length of field (l) = 23 + breadth(b) = 23 + b

Perimeter of field = 206 m



We know that,

$$\text{Perimeter} = 2(l + b)$$

$$= 206 = 2(23 + b + b)$$

$$= 206 = 2(23 + 2b)$$

$$= 206 = 46 + 4b$$

$$= 4b = 206 - 46$$

$$= 4b = 160$$

$$= b = 40 \text{ m}$$

Therefore,

$$\text{Length of field} = 23 + b$$

$$= 23 + 40$$

$$= 63 \text{ m}$$

Now,

$$\text{Area of rectangle} = \text{Length} \times \text{Breadth}$$

$$= 63 \times 40$$

$$= 2520 \text{ m}^2$$

Question: 3

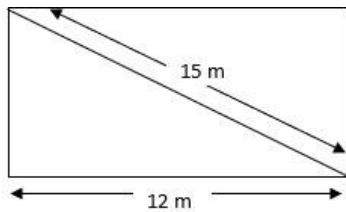
The length of a r

Solution:

Given:

$$\text{Length} = 12 \text{ m}$$

$$\text{Length of diagonal} = 15 \text{ m}$$



We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= 12^2 + \text{Perpendicular}^2 = 15^2$$

$$= \text{Perpendicular}^2 = 15^2 - 12^2$$

$$= \text{Perpendicular}^2 = 225 - 144$$

$$= \text{Perpendicular}^2 = 81$$

$$= \text{Perpendicular}^2 = 9$$

That is,

$$\text{Breadth} = 9 \text{ m}$$

Now,

$$\text{Area} = \text{Length} \times \text{Breadth}$$

$$= 12 \text{ m} \times 9 \text{ m}$$

$$= 108 \text{ m}^2$$

Question: 4

The cost of carpe

Solution:

Given:

Length of room = 15 m

Width of carpet = 75 cm = 0.75 m

Rate = Rs 70

Total cost = Rs 8400

Now,

$$\text{Length of carpet} = \frac{\text{Total cost}}{\text{Rate}}$$

$$= \frac{\text{Rs 8400}}{\text{Rs 70 per m}}$$

$$= 120 \text{ m}$$

Therefore,

Area of carpet = Length of carpet \times Width of carpet

$$= 120 \text{ m} \times 0.75 \text{ m} = 90 \text{ m}^2$$

We know that,

$$\text{Area of room} = \text{Area of carpet} = 90 \text{ m}^2$$

Now,

Area of room = Length of room \times Width of room

$$= 90 \text{ m}^2 = 15 \text{ m} \times \text{Width of room}$$

$$\Rightarrow \text{Width of room} = \frac{90 \text{ m}^2}{15 \text{ m}}$$

$$= \text{Width of room} = 6 \text{ m}$$

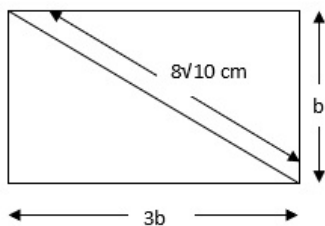
Question: 5

The length of a r

Solution:

Given: Length of rectangle (l) = 3 \times breadth(b) = 3b

Diagonal of rectangle = $8\sqrt{10}$ m



We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$= b^2 + (3b)^2 = (8\sqrt{10})^2$$

$$= b^2 + 9b^2 = 640$$

$$\Rightarrow 10b^2 = 640$$

$$\Rightarrow b^2 = \frac{640}{10}$$

$$\Rightarrow b^2 = 64$$

$$\Rightarrow b = 8 \text{ cm}$$

Therefore,

$$l = 3b = 24 \text{ cm}$$

Hence,

$$\text{Perimeter of a rectangle} = 2(\text{length} + \text{breadth})$$

$$= 2(24 + 8)$$

$$= 64 \text{ cm}$$

Question: 6

On increasing the

Solution:

Let the length be l

And, breadth be b

Now,

$$\text{Area} = l \times b = lb$$

$$\text{Increase in length} = 20\% \text{ of length} + \text{length}$$

$$= \frac{20}{100}l + l$$

$$= \frac{1}{5}l + l$$

$$= \frac{6}{5}l$$

$$\text{Decrease in breadth} = \text{breadth} - 20\% \text{ of breadth}$$

$$= b - \frac{20}{100}b$$

$$= b - \frac{1}{5}b$$

$$= \frac{4}{5}b$$

$$\text{Area} = \frac{6}{5}l \times \frac{4}{5}b = \frac{24}{25}lb$$

Since,

$$\frac{24}{25}lb < lb$$

Therefore,

The area is decreased

$$\text{Now decrease in area} = lb - \frac{24}{25}lb$$

$$= \frac{1}{25}lb$$

$$\text{Decrease\%} = \frac{1}{25} \times 100$$

$$= 4\%$$

Hence change in area = 4% decrease

Question: 7

A rectangular gro

Solution:

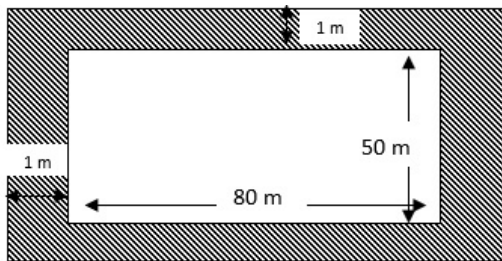
Given:

Length = 80 m

Breadth = 50 m

Width of the path = 1 m

Area of path = 1911 m²



Length of field with path = 80 + (1 + 1)

$$= 82 \text{ m}$$

Breadth of field with path = 50 + (1 + 1)

$$= 52 \text{ m}$$

Area of field with path = Length of field with path × Breadth of field with path

$$= 82 \text{ m} \times 52 \text{ m}$$

$$= 4264 \text{ m}^2$$

Area of field without path = Length without path × Breadth without path

$$= 80 \text{ m} \times 50 \text{ m}$$

$$= 4000 \text{ m}^2$$

Now,

Area of path = Area of field - Area of field without path

$$= 4264 \text{ m}^2 - 4000 \text{ m}^2$$

$$= 264 \text{ m}^2$$

Question: 8

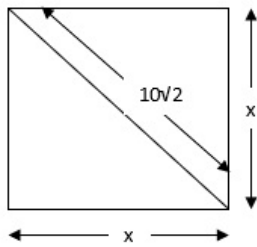
The length of the

Solution:

Given:

Length of diagonal = $10\sqrt{2}$ cm

Let the side of square = x cm



We know that,

$$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Perpendicular}^2$$

$$= (10\sqrt{2})^2 = x^2 + x^2$$

$$= 200 = 2x^2$$

$$\Rightarrow x^2 = \frac{200}{2}$$

$$= x^2 = 100$$

$$= x = 10 \text{ cm}$$

Now,

$$\text{Area of a square} = \text{side}^2$$

$$= (10 \text{ cm})^2$$

$$= 100 \text{ cm}^2$$

Question: 9

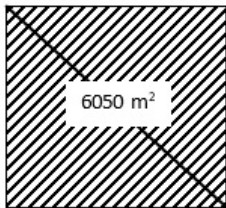
The area of a square

Solution:

Given:

$$\text{Area of square field} = 6050 \text{ m}^2$$

$$\text{Let the side of square} = x \text{ m}$$



We know that,

$$\text{Area of a square} = \text{side}^2$$

$$= 6050 = x^2$$

$$= x = 55\sqrt{2}$$

Now,

$$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Perpendicular}^2$$

$$= (55\sqrt{2})^2 + (55\sqrt{2})^2$$

$$= 6050 + 6050$$

$$= 12100 \text{ m}^2$$

Therefore,

$$\text{Diagonal} = \sqrt{12100}$$

$$= 110 \text{ m}$$

Question: 10

The area of a square

Solution:

Given:

$$\text{Area of square field} = 0.5 \text{ hectare} = 5000 \text{ m}^2$$

Let the side of square = x m



We know that,

$$\text{Area of a square} = \text{side}^2$$

$$= 5000 = x^2$$

$$\Rightarrow x = 50\sqrt{2}$$

Now,

$$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Perpendicular}^2$$

$$= (50\sqrt{2})^2 + (50\sqrt{2})^2$$

$$= 5000 + 5000$$

$$= 10000 \text{ m}^2$$

Therefore,

$$\text{Diagonal} = \sqrt{10000}$$

$$= 100 \text{ m}$$

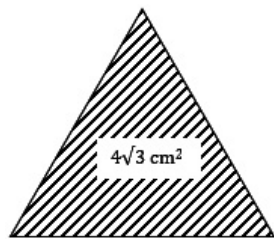
Question: 11

The area of an eq

Solution:

Given:

$$\text{Area of equilateral triangle} = 4\sqrt{3} \text{ cm}^2$$



We know that,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow 4\sqrt{3} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$\Rightarrow \text{side}^2 = 4\sqrt{3} \times \frac{4}{\sqrt{3}}$$

$$= \text{side}^2 = 4 \times 4$$

$$= \text{side}^2 = 16$$

$$= \text{side} = 4 \text{ cm}$$

Now,

$$\text{Perimeter of triangle} = 3 \times \text{side}$$

$$= 3 \times 4 \text{ cm}$$

$$= 12 \text{ cm}$$

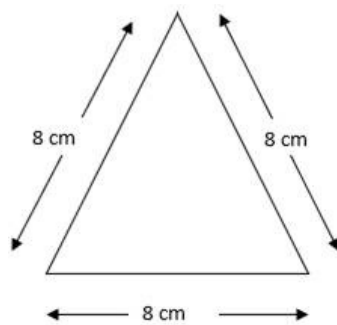
Question: 12

Each side of an e

Solution:

Given:

Side of equilateral triangle = 8 cm



We know that,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 8^2$$

$$= \frac{\sqrt{3}}{4} \times 64$$

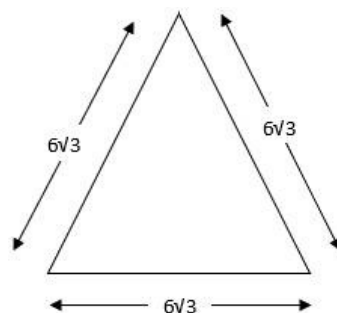
$$= 16\sqrt{3} \text{ cm}^2$$

Question: 13

Each side of an e

Solution:

Given: Side of an equilateral triangle = $6\sqrt{3}$ cm



$$\text{Height of equilateral triangle} = \frac{\sqrt{3}}{2} \times \text{side}$$

$$= \frac{\sqrt{3}}{2} \times 6\sqrt{3}$$

$$= 9 \text{ cm}^2$$

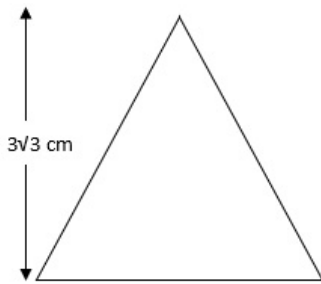
Question: 14

The height of an

Solution:

Given:

$$\text{Height of equilateral triangle} = 3\sqrt{3} \text{ cm}$$



We know that,

$$\text{Height of equilateral triangle} = \frac{\sqrt{3}}{2} \times \text{side}$$

$$\Rightarrow 3\sqrt{3} = \frac{\sqrt{3}}{2} \times \text{side}$$

$$\Rightarrow \text{side} = 3\sqrt{3} \times \frac{2}{\sqrt{3}}$$

$$= \text{Side} = 6 \text{ cm}$$

Now,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 6^2$$

$$= \frac{\sqrt{3}}{4} \times 36$$

$$= 9\sqrt{3} \text{ cm}^2$$

Question: 15

The base and heig

Solution:

Given:

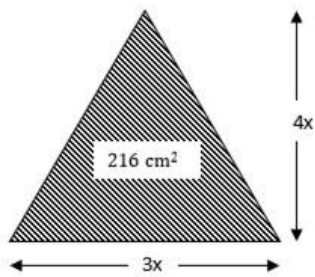
$$\text{Base: Height} = 3: 4$$

$$\text{Area} = 216 \text{ cm}^2$$

Let,

$$\text{Base} = 3x$$

$$\text{Height} = 4x$$



We know that,

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= 216 = \frac{1}{2} \times 3x \times 4x$$

$$= 216 \times 2 = 12x^2$$

$$= 12x^2 = 432$$

$$\Rightarrow x^2 = \frac{432}{12}$$

$$= x^2 = 36$$

$$= x = 6 \text{ cm}$$

Therefore,

$$\text{Height} = 4x$$

$$= 24 \text{ cm}$$

Question: 16

The length of the

Solution:

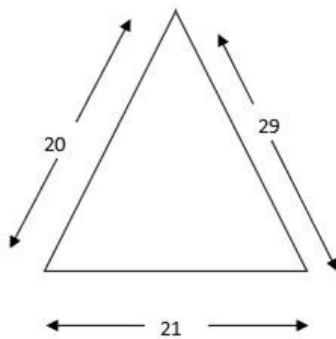
Given:

Rate = Rs 9 per m^2

Side a = 20 m

Side b = 21 m

Side c = 29 m



Area of a scalene triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

$$\text{Where, } s = \frac{a+b+c}{2}$$

$$s = \frac{20 + 21 + 29}{2} \text{ m}$$

$$\Rightarrow s = \frac{70}{2} \text{ m}$$

$$= s = 35 \text{ m}$$

Now,

$$\text{Area of triangular field} = \sqrt{(35 \text{ m} \times (35-20)\text{m} \times (35-21)\text{m} \times (35-29)\text{m})}$$

$$= \sqrt{(35 \text{ m} \times 15 \text{ m} \times 14 \text{ m} \times 6 \text{ m})}$$

$$= \sqrt{44100 \text{ m}^2}$$

$$= 210 \text{ m}^2$$

$$\text{Total Cost} = 210 \text{ m}^2 \times \text{Rs } 9 \text{ per m}^2$$

$$= \text{Rs } 1890$$

Question: 17

The side of a squ

Solution:

Let the side be x

Now,

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times x^2$$

And,

$$\text{Area of square} = \text{side}^2$$

$$= x^2$$

$$\text{Ratio} = \frac{\text{Area of square}}{\text{Area of triangle}}$$

$$= \frac{x^2}{\frac{\sqrt{3}}{4} \times x^2}$$

$$= \frac{4}{\sqrt{3}}$$

Therefore, the ratio is 4:√3

Question: 18

The sides of an e

Solution:

Let the side = radius = x

Now,

$$\text{Area of circle} = \pi r^2$$

$$\Rightarrow 154 = \frac{22}{7} \times x^2$$

$$\Rightarrow x^2 = \frac{154 \times 7}{22}$$

$$= x^2 = 49$$

$$= x = 7 \text{ cm}$$

$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 7^2$$

$$= 49 \frac{\sqrt{3}}{4} \text{ cm}^2$$

Question: 19

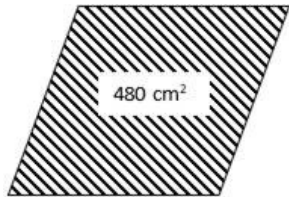
The area of a rho

Solution:

Given:

$$\text{Area of rhombus} = 480 \text{ cm}^2$$

$$\text{Length of diagonal 1 (d}_1\text{)} = 20 \text{ cm}$$



Let, Length of diagonal 2 be d_2

$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$\Rightarrow 480 = \frac{1}{2} \times 20 \times d_2$$

$$\Rightarrow d_2 = \frac{480 \times 2}{20}$$

$$\Rightarrow d_2 = 48 \text{ cm}$$

Now,

$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(48^2 + 20^2)}$$

$$= \frac{1}{2} \times \sqrt{(2304 + 400)}$$

$$= \frac{1}{2} \times \sqrt{2704}$$

$$= \frac{1}{2} \times 52$$

$$= 26 \text{ cm}$$

Question: 20

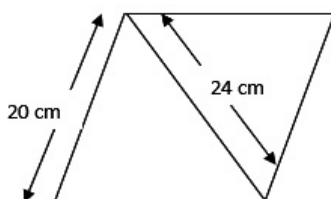
One side of a rho

Solution:

Given:

$$\text{Side} = 24 \text{ cm}$$

$$\text{Length of diagonal 1 (d}_1\text{)} = 20 \text{ cm}$$



Let, Length of diagonal 2 be d_2

We know that,

$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(d_1^2 + d_2^2)}$$

$$= 20 = \frac{1}{2} \times \sqrt{(24^2 + d_2^2)}$$

$$= 20 \times 2 = \sqrt{(576 + d_2^2)}$$

$$= 40 = \sqrt{(576 + d_2^2)}$$

Squaring both sides,

$$= 1600 = 576 + d_2^2$$

$$= d_2^2 = 1024$$

$$= d_2 = 32 \text{ cm}$$

Now,

$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 24 \times 32$$

$$= 384 \text{ cm}^2$$

Exercise : FORMATIVE ASSESSMENT (UNIT TEST)

Question: 1

In the given figure

Solution:

Given:

$$AC = 17 \text{ cm}$$

$$BC = 15 \text{ cm}$$

$$BD = 12 \text{ cm}$$

$$CD = 9 \text{ cm.}$$

$$\angle ABC = 90^\circ$$

$$\angle BDC = 90^\circ$$

In $\triangle ABC$,

Using Pythagoras theorem,

$$AB^2 + BC^2 = AC^2$$

$$= AB^2 = AC^2 - BC^2$$

$$= AB = \sqrt{(AC^2 - BC^2)}$$

$$= AB = \sqrt{(17^2 - 15^2)}$$

$$= AB = \sqrt{(289 - 225)}$$

$$= AB = \sqrt{64}$$

$$= AB = 8 \text{ cm}$$

Therefore,

$$\text{Area of } \triangle ABC = \frac{1}{2} \times AB \times BC$$

$$= \frac{1}{2} \times 8 \times 15$$

$$= 60 \text{ cm}^2$$

And,

In $\triangle BDC$,

$$\text{Area of } \triangle BDC = \frac{1}{2} \times BD \times DC$$

$$= \frac{1}{2} \times 12 \times 9$$

$$= 54 \text{ cm}^2$$

Therefore,

$$\text{Area of quadrilateral } ABCD = \text{Area of } \triangle ABC + \text{Area of } \triangle BDC$$

$$= 60 \text{ cm}^2 + 54 \text{ cm}^2$$

$$= 114 \text{ cm}^2$$

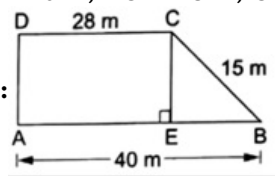
Question: 2

In the given figu

Solution:

Given: ABCD is a trapezium in which $AB = 40 \text{ m}$, $BC = 15 \text{ m}$, $CD = 28 \text{ m}$, $AD = 9 \text{ m}$ and $CE \perp$

AB. **To find:** Area of trap. ABCD



$AB = 40 \text{ m}$, $BC = 15 \text{ m}$, $AD = 9 \text{ m}$ and $CD = 28 \text{ m}$.

In trapezium ABCD,

$$\text{Area of trapezium} = \frac{1}{2} \times \text{sum of parallel sides} \times \text{distance between them}$$

$$= \frac{1}{2} \times (28 + 40) \times 9$$

$$= \frac{1}{2} \times 68 \times 9$$

$$= 306 \text{ m}^2$$

Question: 3

The sides of a tr

Solution:

Given: Ratio of Sides = 12: 14: 25

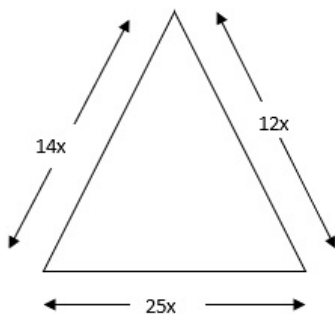
Perimeter = 25.5 cm

Let the sides be,

$$a = 12x \text{ cm}$$

$$b = 14x \text{ cm}$$

$$c = 25x \text{ cm}$$



We know that,

$$\text{Perimeter of a triangle} = a + b + c$$

$$= 25.5 \text{ cm} = 12x \text{ cm} + 14x \text{ cm} + 25x \text{ cm}$$

$$= 25.5 \text{ cm} = 51x \text{ cm}$$

$$\Rightarrow x = \frac{25.5 \text{ cm}}{51 \text{ cm}}$$

$$= x = 0.5$$

Therefore,

$$a = 12x \text{ cm} = 12 \times 0.5 \text{ cm} = 6 \text{ cm}$$

$$b = 14x \text{ cm} = 14 \times 0.5 \text{ cm} = 7 \text{ cm}$$

$$c = 25x \text{ cm} = 25 \times 0.5 \text{ cm} = 12.5 \text{ cm}$$

Clearly largest side is $c = 12.5 \text{ cm}$

Question: 4

The parallel side

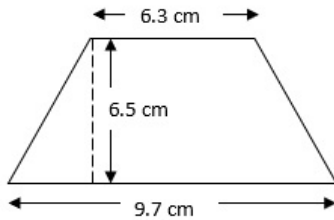
Solution:

Given:

Side 1 = 9.7 cm

Side 2 = 6.3 cm

Distance between sides = 6.5 cm



Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{distance between them}$

$$= \frac{1}{2} \times (9.7 + 6.3) \times 6.5$$

$$= \frac{1}{2} \times 16 \times 6.5$$

$$= 52 \text{ cm}^2$$

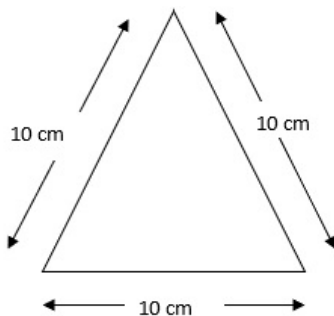
Question: 5

Find the area of

Solution:

Given:

Side of an equilateral triangle = 10 cm



$$\text{Area of equilateral triangle} = \frac{\sqrt{3}}{4} \times \text{side}^2$$

$$= \frac{\sqrt{3}}{4} \times 10^2$$

$$= \frac{\sqrt{3}}{4} \times 100$$

$$= \frac{100\sqrt{3}}{4}$$

$$= 25\sqrt{3}$$

$$= 25 \times 1.732$$

$$= 43.3 \text{ cm}^2$$

Question: 6

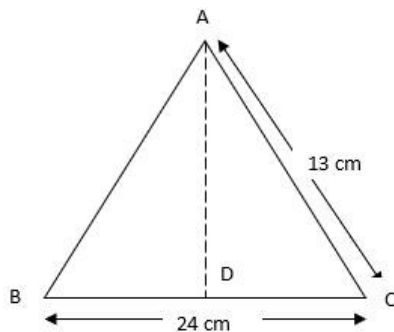
Find the area of

Solution:

Given:

Side AB = Side AC = 13 cm

Base = 24 cm



In $\triangle ADC$ (right-angled),

$DC = 12 \text{ cm}$

By Pythagoras theorem,

$$AD^2 + DC^2 = AC^2$$

$$= AD^2 = AC^2 - DC^2$$

$$= AD^2 = 13^2 - 12^2$$

$$= AD^2 = 169 - 144 = 25$$

$$= AD = 5 \text{ cm}$$

Now,

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times BC \times AD$$

$$= \frac{1}{2} \times 24 \times 5$$

$$= 60 \text{ cm}^2$$

Question: 7

The longer side o

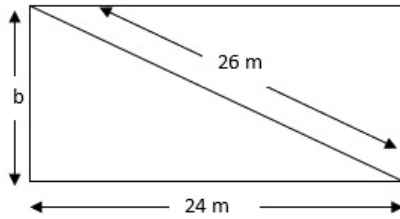
Solution:

Given:

Length (l) = 24 m

Diagonal = 26 m

Let breadth be b



We know that,

$$\text{Base}^2 + \text{Perpendicular}^2 = \text{Hypotenuse}^2$$

$$\Rightarrow 24^2 + b^2 = 26^2$$

$$\Rightarrow b^2 = 26^2 - 24^2$$

$$\Rightarrow b^2 = 676 - 576 = 100$$

$$\Rightarrow b = 10 \text{ m}$$

Area of rectangle = Length \times Breadth

$$= 24 \text{ m} \times 10 \text{ m}$$

$$= 240 \text{ m}^2$$

Question: 8

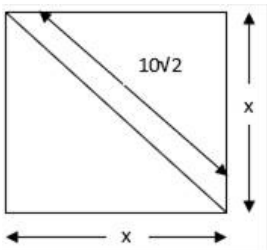
The length of the

Solution:

Given:

Length of diagonal = 24 cm

Let the side of square = x cm



We know that,

$$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Perpendicular}^2$$

$$\Rightarrow 24^2 = x^2 + x^2$$

$$\Rightarrow 576 = 2x^2$$

$$\Rightarrow x^2 = \frac{576}{2}$$

$$\Rightarrow x^2 = 288$$

$$\Rightarrow x = 12\sqrt{2} \text{ cm}$$

Now,

Area of a square = side²

$$= (12\sqrt{2} \text{ cm})^2$$

$$= 288 \text{ cm}^2$$

Question: 9

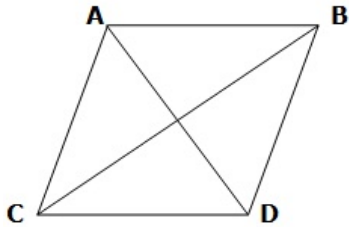
Find the area of

Solution:

Given:

Length of diagonal 1 (d_1) = 48 cm

Length of diagonal 2 (d_2) = 20 cm



$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 48 \text{ cm} \times 20 \text{ cm}$$

$$= 480 \text{ cm}^2$$

Question: 10

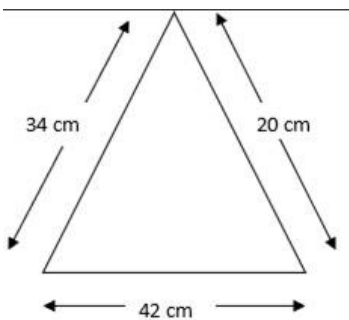
Find the area of

Solution:

Given: Side 1 = a (let) = 42 cm

Side 2 = b (let) = 34 cm

Side 3 = c (let) = 20 cm



We know that,

$$\text{Area of a scalene triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\text{Where, } s = \frac{a+b+c}{2}$$

$$s = \frac{42 + 34 + 20}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$= s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48 \text{ cm} \times (48-42) \text{ cm} \times (48-34) \text{ cm} \times (48-20) \text{ cm})}$$

$$= \sqrt{(48 \text{ cm} \times 6 \text{ cm} \times 14 \text{ cm} \times 28 \text{ cm})}$$

$$= \sqrt{112896} \text{ cm}^2$$

$$= 336 \text{ cm}^2$$

Question: 11

A lawn is in the

Solution:

Given: Cost of fencing lawn = Rs 20 per metre.

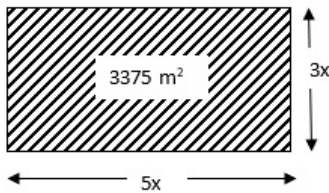
$$\text{Area of lawn} = 3375 \text{ m}^2$$

$$\text{Length} : \text{Breadth} = 5:3$$

Let,

$$\text{Length} = 5x$$

$$\text{Breadth} = 3x$$



We know that,

$$\text{Area of lawn} = \text{Length} \times \text{Breadth}$$

$$= 3375 \text{ m}^2 = 5x \times 3x$$

$$= 3375 \text{ m}^2 = 15x^2$$

$$\Rightarrow x^2 = \frac{3375}{15} \text{ m}^2$$

$$= x^2 = 225 \text{ m}^2$$

$$= x = 15 \text{ m}$$

Therefore,

$$\text{Length} = 5x = 5 \times 15 = 75 \text{ m}$$

$$\text{Breadth} = 3x = 3 \times 15 = 45 \text{ m}$$

Now,

$$\text{Perimeter of lawn} = 2(\text{length} + \text{breadth})$$

$$= 2(75 \text{ m} + 45 \text{ m})$$

$$= 2 \times 120 \text{ m}$$

$$= 240 \text{ m}$$

Hence,

$$\text{Cost of Fencing} = 240 \text{ m} \times \text{Rs } 20 \text{ per meter}$$

$$= \text{Rs } 4800$$

Question: 12

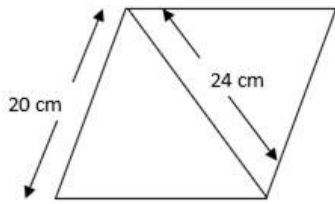
Find the area of

Solution:

Given:

$$\text{Length of diagonal 1 } (d_1) = 24 \text{ cm}$$

Side = 20 cm



Let, Length of diagonal 2 be d_2

We know that,

$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(d_1^2 + d_2^2)}$$

$$= 20 = \frac{1}{2} \times \sqrt{(24^2 + d_2^2)}$$

$$= 20 \times 2 = \sqrt{(576 + d_2^2)}$$

$$= 40 = \sqrt{(576 + d_2^2)}$$

Squaring both sides,

$$= 1600 = 576 + d_2^2$$

$$= d_2^2 = 1600 - 576$$

$$= d_2^2 = 1024$$

$$= d_2 = 32 \text{ cm}$$

Now,

$$\text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2$$

$$= \frac{1}{2} \times 24 \times 32$$

$$= 384 \text{ cm}^2$$

Question: 13

Find the area of

Solution:

Given:

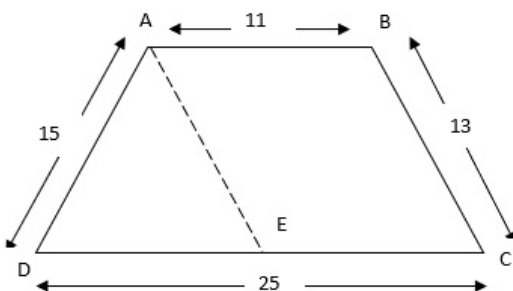
$$AB (\text{say}) = 11 \text{ cm}$$

$$DC (\text{say}) = 25 \text{ cm}$$

$$AD (\text{say}) = 15 \text{ cm}$$

$$BC (\text{say}) = 13 \text{ cm}$$

Draw $AE \parallel BC$



Now the trapezium is divided into a triangle ADE and a parallelogram AECB.

Since, AECB is a parallelogram

Therefore, $AE = BC = 13 \text{ cm}$

And, $AB = EC$

$DE = DC - EC (= AB) = 25 - 11 = 14 \text{ cm}$

Now,

We know that,

Area of a scalene triangle (ΔAED) = $\sqrt{s(s-AE)(s-ED)(s-AD)}$

Where, $s = \frac{AE + ED + AD}{2}$

$$s = \frac{13 + 14 + 15}{2} \text{ cm}$$

$$\Rightarrow s = \frac{42}{2} \text{ cm}$$

$$\Rightarrow s = 21 \text{ cm}$$

Now,

Area of a scalene triangle = $\sqrt{(21\text{cm} \times (21-13)\text{cm} \times (21-14)\text{cm} \times (21-15)\text{cm})}$

$$= \sqrt{(21\text{cm} \times 8\text{cm} \times 7\text{cm} \times 6\text{cm})}$$

$$= \sqrt{7056 \text{ cm}^2}$$

$$= 84 \text{ cm}^2$$

Also,

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= 84 = \frac{1}{2} \times 14 \times \text{height}$$

$$\Rightarrow \text{height} = \frac{84 \times 2}{14}$$

$$= \text{height} = 12 \text{ cm}$$

Now,

Area of a parallelogram = base \times height

$$= 11 \text{ cm} \times 12 \text{ cm}$$

$$= 132 \text{ cm}^2$$

Now,

Area of Trapezium ABCD = Area of ΔADE + Area of a parallelogram ABCE

$$= 84 \text{ cm}^2 + 132 \text{ cm}^2$$

$$= 216 \text{ cm}^2$$

Question: 14

The adjacent side

Solution:

Given:

$$AB = 34 \text{ cm}$$

$$BC = 20 \text{ cm}$$

$$AC = 42 \text{ cm}$$

The diagonal of a parallelogram divides it into two equal triangles.

Therefore,

$$\text{Area of ABCD} = 2 \times \text{Area of } \triangle ABC$$

Now,

We know that,

$$\text{Area of a scalene triangle} = \sqrt{s(s-AC)(s-AB)(s-BC)}$$

$$\text{Where, } s = \frac{AC + AB + BC}{2}$$

$$s = \frac{42 + 34 + 20}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$= s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48 \text{ cm} \times (48-42) \text{ cm} \times (48-34) \text{ cm} \times (48-20) \text{ cm})}$$

$$= \sqrt{(48 \text{ cm} \times 6 \text{ cm} \times 14 \text{ cm} \times 28 \text{ cm})}$$

$$= \sqrt{112896 \text{ cm}^2}$$

$$= 336 \text{ cm}^2$$

Therefore,

$$\text{Area of ABCD} = 2 \times 336 \text{ cm}^2$$

$$= 672 \text{ cm}^2$$

Question: 15

The cost of fenci

Solution:

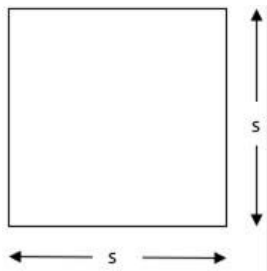
Given:

$$\text{Rate} = \text{RS. } 14 \text{ per metre}$$

$$\text{Total Cost} = \text{RS. } 2800$$

$$\text{Rate of mowing} = \text{RS. } 54 \text{ per } 100 \text{ m}^2$$

Let the side of square field be s



Now,

$$\text{Perimeter} = \frac{\text{Total Cost}}{\text{Rate}}$$

$$= \frac{2800}{14}$$

$$= 200 \text{ m}$$

$$\text{Perimeter} = 4 \times \text{side}$$

$$= 200 \text{ m} = 4 \times s$$

$$\Rightarrow s = \frac{200}{4}$$

$$= s = 50 \text{ m}$$

Now,

$$\text{Area} = \text{side}^2$$

$$= (50 \text{ m})^2$$

$$= 2500 \text{ m}^2$$

Therefore,

$$\text{Cost of mowing } 100 \text{ m}^2 = \text{Rs } 54$$

$$\text{Cost of mowing } 1 \text{ m}^2 = \text{Rs } \frac{54}{100}$$

$$\text{Cost of mowing } 2500 \text{ m}^2 = \text{Rs } \frac{54}{100} \times 2500$$

$$= \text{Rs } 1350$$

Question: 16

Find the area of

Solution:

Given:

$$DB = 20 \text{ cm}$$

$$AB = 42 \text{ cm}$$

$$AD = 34 \text{ cm}$$

$$CD = 29 \text{ cm}$$

$$CB = 21 \text{ cm}$$

In $\triangle ABD$ (scalene),

$$\text{Area of a scalene triangle} = \sqrt{s(s-AB)(s-BD)(s-AD)}$$

$$\text{Where, } s = \frac{AB + BD + AD}{2}$$

$$s = \frac{42 + 20 + 34}{2} \text{ cm}$$

$$\Rightarrow s = \frac{96}{2} \text{ cm}$$

$$= s = 48 \text{ cm}$$

Now,

$$\text{Area of a scalene triangle} = \sqrt{(48 \text{ cm} \times (48-42) \text{ cm} \times (48-20) \text{ cm} \times (48-34) \text{ cm})}$$

$$= \sqrt{(48 \text{ cm} \times 6 \text{ cm} \times 28 \text{ cm} \times 14 \text{ cm})}$$

$$= \sqrt{112896 \text{ cm}^2}$$

$$= 336 \text{ cm}^2$$

Similarly,

In $\triangle BCD$ (scalene),

Area of a scalene triangle = $\sqrt{s(s-BC)(s-CD)(s-BD)}$

Where, $s = \frac{BC+BD+CD}{2}$

$$s = \frac{29 + 20 + 21}{2} \text{ cm}$$

$$\Rightarrow s = \frac{70}{2} \text{ cm}$$

$$\Rightarrow s = 35 \text{ cm}$$

Now,

Area of a scalene triangle = $\sqrt{(35 \text{ cm} \times (35-29)\text{cm} \times (35-20)\text{cm} \times (35-21)\text{cm})}$

$$= \sqrt{(35 \text{ cm} \times 6 \text{ cm} \times 15 \text{ cm} \times 14 \text{ cm})}$$

$$= \sqrt{44100 \text{ cm}^2}$$

$$= 210 \text{ cm}^2$$

Now,

Area of quadrilateral ABCD = Area of $\triangle ABD$ + Area of $\triangle BCD$

$$= 336 \text{ cm}^2 + 210 \text{ cm}^2$$

$$= 546 \text{ cm}^2$$

Question: 17

A parallelogram a

Solution:

Given:

Diagonal 1 (d_1) of rhombus = 120 m

Diagonal 2 (d_2) of rhombus = 44 m

Side of parallelogram = 66 m

Area of rhombus = $\frac{1}{2} \times d_1 \times d_2$

$$= \frac{1}{2} \times 120 \text{ m} \times 44 \text{ m}$$

$$= 2640 \text{ m}^2$$

Now,

Area of parallelogram = Base \times Height

$$\Rightarrow 2640 \text{ m}^2 = 66 \text{ m} \times \text{Height}$$

$$\Rightarrow \text{Height} = \frac{2460}{66}$$

$$\Rightarrow \text{Height} = 40 \text{ m}$$

Question: 18

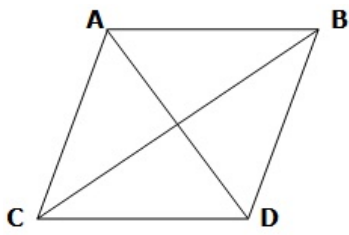
The diagonals of

Solution:

Given:

Length of diagonal 1 (d_1) = 48cm

Length of diagonal 2 (d_2) = 20 cm



$$\text{Side of rhombus} = \frac{1}{2} \times \sqrt{(d_1^2 + d_2^2)}$$

$$= \frac{1}{2} \times \sqrt{(48^2 + 20^2)}$$

$$= \frac{1}{2} \times \sqrt{(2304 + 400)}$$

$$= \frac{1}{2} \times \sqrt{2704}$$

$$= \frac{1}{2} \times 52$$

$$= 26 \text{ cm}$$

Therefore,

$$\text{Perimeter of rhombus} = 4 \times \text{Side of rhombus}$$

$$= 4 \times 26 \text{ cm}$$

$$= 104 \text{ cm}$$

Question: 19

The adjacent side

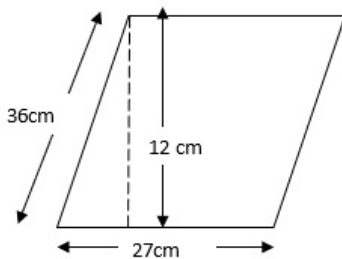
Solution:

Given:

Longer side = 36 cm

Shorter side = 27 cm

Distance between Shorter sides = 12 cm



Let, Distance between Longer sides = x cm

Now,

Area of parallelogram = Shorter Side \times Distance between Longer sides

$$= 27 \text{ cm} \times 12 \text{ cm}$$

$$= 324 \text{ cm}^2$$

Also,

Area of parallelogram = Longer side \times Distance between Longer sides

$$= 324 \text{ cm}^2 = 36 \text{ cm} \times x \text{ cm}$$

$$\Rightarrow x = \frac{324}{36}$$

$$= x = 9 \text{ cm}$$

Hence,

Distance between Shorter sides = 9 cm

Question: 20

In a four sided f

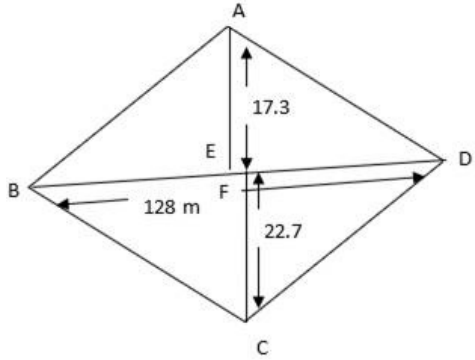
Solution:

Given:

$$BD = 128 \text{ m}$$

$$CF = 22.7 \text{ m}$$

$$AE = 17.3 \text{ m}$$



Now,

In $\triangle ABD$,

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times BD \times AE$$

$$= \frac{1}{2} \times 128 \times 17.3$$

$$= 1107.2 \text{ m}^2$$

Similarly,

In $\triangle CBD$,

Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times BD \times FC$$

$$= \frac{1}{2} \times 128 \times 22.7$$

$$= 1452.8 \text{ m}^2$$

Now,

Area of field = $\triangle ABD + \triangle CBD$

$$= 1107.2 \text{ m}^2 + 1452.8 \text{ m}^2$$

$$= 2560 \text{ m}^2$$